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THE MANUFACTURE OF BRASS AND COPPER WARES IN ASSAM.

By Mr. E. A. GAIT, Director, Department of Land Records and Agriculture, Assam.

One of the provincial peculiarities disclosed by the Caste tables prepared in connection with the last Census was the almost entire absence in the Assam Valley of the lower professional castes which are found in almost all other parts of India. This fact explains why, as has so frequently been pointed out, that portion of the province possesses no local industries of interest or importance.

It is true that in the time of native rulers some industries were fostered, and we read that the Ahom king Chu Chengpha (also known as the Burhá Raja or Prataáp Singh), who reigned from 1611 to 1649 A.D., introduced goldsmiths, blacksmiths and other artizans from Koch Bihár, and tried to induce his subjects to follow similar occupations. Some of them did so; a section of the Kacháris took to gold-washing and became known as Sonowál Kacháris; members of the Koch, Kalita and other agricultural castes became, some of them potters, others blacksmiths, and others workers in brass and bell metal; and, according to the occupation adopted, the words Kumár, Kámár and Káshár were prefixed to their proper caste names. But the time which elapsed between the date when they began to take up these trades and the occupation of the country by the British, was too short to allow of the development of any special skill, or the origination of any manufactures possessing peculiar local characteristics. When Assam became British territory, none of the occupational sub-castes, which had begun to form, had developed sufficiently to have drifted apart from the main body of the castes to which they belonged; intermarriage was still permitted between them and their caste-fellows, and there was nothing to prevent them from following agriculture as a means of livelihood, any more than there was to prevent other members of these castes from becoming potters or blacksmiths or workers in brass or bell metal.

As soon as the advent of the British opened up the province to external trade, the effects of this absence of special skill and of the want of fixity of occupation which caste scruples impose elsewhere, soon became apparent. Cheaper and better articles of foreign manufacture began to oust the local products, and most of the persons engaged in making the latter, when they found that their trade was becoming unprofitable, abandoned it, and turned their attention to agriculture. With very few exceptions, the articles which are still manufactured in the Assam Valley consist of the cheap utensils in common daily use, the making of which requires no special skill, and on which the cost of freight places imported wares at a great disadvantage as compared with those made locally.

In the Surma Valley also, although there are more persons belonging to the professional castes of the Nava Sákha group, it would seem that agriculture is generally preferred by them as a more honourable means of livelihood, and that the comparatively small numbers who still follow their traditional occupations, are unable to compete successfully with foreign manufacturers, except in regard to the cheap and common articles above referred to.

The Native State of Manipur is the only place in the province where articles of ornament as well as use are made, and even there, there is very little that deserves special mention.

So far as the character of the articles made is concerned, the above general observations apply in their entirety to the local manufacture of brass and copper wares. With the exception of Manipur, copper ware is made nowhere in the province, while brass and bell metal are only worked up into the common pots and pans in daily use amongst the people. But, even of these common utensils, the local supply is insufficient, and large quantities are annually imported from Bengal. No district in Assam is specially noted for its manufactures of this description.

The general considerations mentioned in the introductory paragraph apply also to the caste of the persons engaged in manufacturing articles of copper and bell metal in the Assam Valley districts. They are for the most part persons of the Kalita, Koch, and Kewat castes, the word Káshár being tacked on to their proper caste-name as an indication of the occupation which they follow. There is, however, no real distinction between Kalitas, Koches, and Kewats, who are Káshárs, and other persons belonging to these castes, except that the agricultural community look down on all persons following mechanical pursuits, and describe them as "Saru" or "small," while they call themselves "Bar" or "great."

The manufacture of brass utensils, on the other hand, enjoys the distinction of being the only industry of the sort which is appropriated by a particular caste. It is the traditional occupation of the Morias, who have a very peculiar history. The *Asám Buranjis* (historical narratives) state that they are the descendants of prisoners captured by the Ahoms during Turbuk's unsuccessful invasion of their territory about 1506 A.D. These prisoners, it is said, were at first employed as grass-cutters for the State elephants, but proved so useless that they were soon employed instead as cultivators, but at this work also they proved utterly useless. They were then left to their own devices, with the result that they adopted brass working as a means of earning a living, and on this occupation they are still exclusively employed. Cases in which Morias have taken to agriculture are very rare.

Owing to their isolation, the Morias gradually fell away from the observances enjoined by their religion, and a few years ago it was stated regarding them that they ate pork and drank spirits, and had given up the practice of circumcision. Of late, however, the Mullahs have been at work among them, and they are now rapidly assimilating their practices and habits of life to those of ordinary Musalmans.

The origin of their name is not certain; it may be a corruption of *mariya* (beating), a name applied with reference to their use of the hammer for making their wares, or it may be a jingling corruption of Goria, a term assumed by the ordinary Musalmans of this province as an assertion of their claim to have come originally from Gaur.

The necessity for living near their market has led the Morias to migrate a good deal, and within the last few years one colony has left Sibságar and settled in Mangaldai, and another has gone from Jorhát to Silghát in the Nowgong district. They are a very industrious people, working often till a late hour of the night, and, unlike other artizans in this province (with the single exception of the Hiras), they are aided in their work by their women.

I have no special information regarding the persons employed on this work in Sylhet and Cachar, beyond that they belong to the Kánsári caste, and differ in no important respect from the members of this caste in Bengal. Their homes are mostly in the Hábiganj and South Sylhet subdivisions, and in pargana Pánchakhanda in the Karimganj subdivision, but the chief places where they ply their trade are Sylhet town and Nijpát Jáintiápur.

In Manipur copper is worked by the Kaisám, Kángbám, and Taurángbám sections of the people; bell metal by the Ahaibám and Senjám; and brass by all the above, but principally by those mentioned as working in copper, who are also very often goldsmiths.

METHOD OF MANUFACTURE.—In the days of the Ahom kings, it is said that bell metal was made locally, but that is no longer the case; and even when it was done, the product is said to be inferior to that obtainable from Bengal. The raw material is now either imported from Bengal, or obtained by the purchase of broken or unserviceable articles made of this alloy. Bell metal utensils are manufactured by casting in moulds. They are generally made to order, and are not usually manufactured in large quantities for sale to possible customers. The chief centres of manufacture are Sarthaibári in the Barpeta, and Titábar in the Jorhát subdivision. As has already been stated, the local supply is not sufficient to meet local requirements, and importations from Bengal are considerable.

The Morias, on the other hand, never resort to casting, but make their utensils from thin sheets of brass, which they hammer out and piece together so as to obtain the desired shape. These sheets, which are imported from Europe, are purchased by them from Márwári merchants, who often sell them on credit, on the understanding that the manufactured utensils will be sold to them at a somewhat reduced rate. The following description of the instruments used by them, and the way in which they are applied, is reproduced from a Note written by Mr. Darrah in 1885:—

1. *Belmuri* (large anvil).—This is a block of iron, shaped like a short, thick, flat-topped tent-peg. The diameter of the top is about one-third the whole length. The pointed extremity is driven through a hole in a small board and into the ground below. The board keeps the anvil from being driven too far into the ground by the hammering it receives during work.

2. *Chatuli* (small anvil).—This is a bar of iron, shaped exactly like a tent-peg, with a flattish head. The pointed end is driven into the ground, and the article to be manufactured beaten into shape on the top.

3. *Dheka* (double anvil).—This is shaped like the head of a hammer, except that it is thinner, longer, and has one end pointed. The part which in a hammer is prolonged over the wood of the handle consists in the *dheka* of a point, which is driven into the ground or a piece of wood when the implement is being used.

4. *Harugara* (hammer).—It is medium-sized, with one straight and round, one curved and chisel-shaped extremity. The handle passes through a hole in the head.

5. *Patmara* (hammer).—Shaped like a pick-axe, but with chisel-shaped ends.

6. *Barhaturi* (large hammer).—Shaped like a *harugara*, but very much larger and heavier. The flat extremity is hexagonal in shape. It is only employed in heavy work.

7. *Galmara* (hammer).—The head is very long and thin, but the general shape is the same as the *harugara*. It is used for hammering the interior of utensils into which ordinary hammers cannot go.

8. *Mathani*.—A small thick-set hammer, with one end shorter than the other.

9. *Saráh* (pincers).—There are two kinds, one like an ordinary pair of English blacksmith's pincers, and one like a pair of sugar-tongs.

10. *Kati* (scissors).—Roughly made, and with blunt points, but strong enough to cut sheet brass.

11. *Bhati* (bellows).—These are made of goat's skin, with the hair outside. They are funnel-shaped, and the point of the funnel is connected by means of a small bamboo pipe with a narrow underground channel communicating with the bottom of the furnace. The upper part terminates in a wide mouth, formed by two slips of bamboo about a foot long. A loop of string attached to the centre of each connects the two slips of bamboo. The operator works the bellows with his left hand, adjusting the fire with a rod held in his right. The loop passes over his hand, and as he raises it with the slips of bamboo apart, air fills the bellows; the hand is then closed, thereby bringing the two slips together and pressed down, and forces the air into the furnace.

12. *Aphuri* (furnace).—This is simply a hollow in the floor of the hut.

13. *Bagi* (chisels).—These are small instruments with the extremities slightly bent, and used for cutting rings and other ornamental devices on the finished brass utensils.

14. *Mahi* (crucible).—A small gourd-shaped vessel of baked clay, about 4 inches in diameter. When in use, the mouth is covered by a little cake of clay called *maula*.

15. *Pajal* (mould).—This is a piece of baked clay, exactly like a brick, with hollows of various shapes on the surface.

16. *Naora* (a wooden trough containing water).—It usually stands close to the *aphuri*.

17. *O* (file).—Triangular and square ones are in use. The latter are made by the Morias themselves, and are very rough.

18.—*Nagara*.—A ring used in breaking up *pán* as described below.

19. *Kundha*.—This is a species of lathe, consisting of a rod of wood inserted at one end into one of the posts of the house, and at the other into a peg (*barisila*) driven into the ground. Articles which are ornamented by rings cut into the brass, are fixed on the rod with lac and turned.

Pán is the material used in joining the sheet brass where a junction is necessary. It is made by melting together three parts of sheet brass and one part of solder (*setu*). The result is a brittle compound, which is broken up into fragments on the anvil, inside the *nagara*. The *pán* will not flatten out when struck by a hammer; it breaks up. In melting the *pán*, the crucible is more than once taken out of the fire, and rolled in a heap of rice husks (*tuh*). This is said to remove all danger of the clay breaking. Goat's fat is put into the mould before the melted *pán* is poured into it. When it becomes necessary to join the two edges of a sheet of brass, nicks are cut in one edge and the other edge fitted into these, and the two beaten flat. Then a rough paste is made of some broken-up *pán* and borax (*soyaga*), which is smeared over the joining. The junction is then heated; the *pán* melts, and the union is cemented.

In the Surma Valley, as in the Assam Valley, brass utensils are invariably made by hammering out thin sheets of the metal, which are imported from Calcutta either by the braziers themselves or through *aratdars* (commission agents). Bell metal utensils are cast.

In Manipur also, the usual manner of working brass is that described above. The two clans (Ahaibám and Senjám) who work chiefly in bell metal are reported also to cast brass, but they do very little work in this metal. The raw material, of course, is imported.

The manner of making bell metal utensils, which are manufactured by the two clans just mentioned, is described by the Political Agent as follows:—

A solid mould of clay and rice-husks, after being turned to the required shape in a lathe, is burnt. It is then coated with wax, which, being well smoothed and daubed over with a mixture of reed ash and earth, is itself coated over with a layer of clay and *bhusi*. This is dried, but not burned in the fire, and after the wax has been melted out by the application of heat, the molten bell metal is poured into the now empty space which the wax occupied. The vessel, after cooling, is extracted from the earthen mould, and is turned in a lathe and polished.

The material, presumably, is imported, and so also is the copper, which is worked by the Kaisám, Kángbám, and Taurángbám sections. An attempt was made by one of the Maharajas to work the copper which is found in the hills on the east of the State near Tammu, but the metal produced was of inferior quality, and the idea was consequently abandoned.

The following is a list of the different utensils manufactured from brass, copper, and bell metal:—

ASSAM VALLEY.

BRASS.—Berha: a tripod consisting of a ring about a foot in diameter, supported on three hollow legs, the interior of which is filled with pieces of broken brass, which produce a jingling sound; the tripod stands about 14 inches high, and is used to support the flat dish out of which an Assamese of the better class eats his rice. [see Pl. 6]. Chaki: a lamp, or rather brass stand, with an open cup-shaped vessel at the top, which is used for holding oil. The wicks are simply threads of cotton laid across the ends, projecting beyond the edges of the cup [see Pl. 6]. Chariya: used as a wash-hand basin, and sometimes also as a receptacle for sundry articles; the same as the *tagar* of the Surma Valley; also made of bell metal. Don: a measure holding five seers [see Pl. 7]. Ghagari: a decanter-shaped vessel with an ornamented top, formed of 8 pieces of brass, and used for keeping and carrying water in [see Pl. 7]. Ghati: a small jug. Ghochha: a lamp stand. Kalah or Kalsi: this is exactly like the *ghagari*, except that it is provided with a brass rim round the bottom to enable it to be placed upright; the top is sometimes ornamented and sometimes plain; also made of bell metal and copper; those of copper are used for holding water

for religious ceremonies; the same as the *kalsi* of the Surma Valley and the *tukna* of Manipur. Karia: milking-pot [see Pl. 7]. Kharahi: a sieve used for rinsing rice; the same as the *jhanjri* of the Surma Valley. [see Pl. 8]. Khundana: something like an elongated thimble, used by old people for pounding *pán* and betel-nut so as to facilitate mastication. Lota: a sort of small jug used for holding water, and also as a drinking vessel; the same as the *lota* of the Surma Valley and the *khujai* of Manipur; also made of bell metal. Sarai: a round tray used by Hindus for carrying rice, pulse, fruit and other articles when making religious offerings; also made of copper. [see Pl. 8]. Seta: a large spoon with a handle, thin towards the bowl and thick towards the opposite extremity, used in distributing rice and curry; the same as the *hata* of the Surma Valley. Tema: a small round box in which areca nuts are kept; the same as the *dibi* of the Surma Valley; also made of bell metal. [see Pl. 5]. Temi: a box smaller than the *tema*, in which the lime eaten with the betel is kept; the same as the *chunati* of the Surma Valley; also made of bell metal. [see Pl. 8]. Thali or Jhaka: a large boiling vessel. Tou: a basin-shaped vessel generally used for cooking food and boiling paddy, and sometimes also for keeping various things, water, paddy, &c.; the same as the *tasla* of the Surma Valley.

BELL METAL.—Banbati: a cup joined to a circular rim at the bottom, for holding curry. [see Pl. 3]. Banthal: a concave-shaped round dish, joined to a circular rim at the bottom, for holding rice. [see Pl. 4]. Barkah: a gong. Bati: a cup for holding curry, &c.; the same as the *bati* of the Surma Valley and the *tengkot* of Manipur; also made of copper. Bota: a flat circular basin with raised edge (generally ornamented) joined to a circular rim at the bottom, for holding betel-nuts. [see Pl. 4]. Dog-dogi: similar to a *lota*. Kahi: a flat circular basin with a raised edge, for holding rice; the same as the *thal* of the Surma Valley and the *pukam* of Manipur. Maipong: the same as the *banthal*, with the addition of a cover. Pandhoa: a flat basin with ornamented raised edge, for holding rice. [see Pl. 4]. Pikdan: a spittoon; the same as the *kwasen* of Manipur. Tal: cymbals; the same as the *karatal* of the Surma Valley and the *kardan* of Manipur. [see Pl. 5].

SURMA VALLEY.

BRASS.—Bata: a shallow pan for holding betel-leaf, areca nuts, &c. Dabar: a wash-hand basin. Deg: used for cooking rice, &c.; same as the *deg* of Manipur. Hata: a large spoon with a handle, used in distributing rice and curry; same as the *seta* of the Assam Valley. Jhanjri: a sieve for cleansing rice; same as the *kharahi* of the Assam Valley. Kalsi: a large jug for carrying water; same as the *kalah* of the Assam Valley and the *tukna* of Manipur. Lota: a small jug used for holding water, also as a drinking vessel; same as the *lota* of the Assam Valley and the *khujai* of Manipur. Modhara: a pot with a narrow neck, used as a still by the inhabitants of the Khasi and Jaintia Hills; imported from Sylhet. Tagar: a sort of wash-hand basin; same as the *chariya* of the Assam Valley. Tasla: a basin-shaped vessel used for cooking food, &c.; same as the *tou* of the Assam Valley. Thal: a dish for holding rice and curry; same as the *pukam* of Manipur and the *kahi* of the Assam Valley.

BELL METAL.—Bati: a cup; same as the *tengkot* of Manipur and the *bati* of the Assam Valley; also made of brass. Batlai: a vessel for cooking rice, used by Hindu widows of the better class. [see Pl. 2]. Chunati: a small round pot with a cover, in which the lime eaten with the betel is kept; the same as the *temi* of the Assam Valley; exported to the Khasi and Jaintia Hills. [see Pl. 2]. Dibi: a small round pot (larger than the *chunati*) with a cover, in which prepared betel is kept; the same as the *tema* of the Assam Valley. [see Pl. 2]. Hukar khol: used for mounting cocoanut *hukas*. Karatal: flat round plates (cymbals) with a hole in the centre, through which a string is passed; used at *sankirtans* (hymn songs) as a musical instrument; the same as the *kardan* of Manipur and the *tal* of the Assam Valley.

MANIPUR.

BRASS.—Deg: used for cooking rice, boiling water, &c.; the same as the *deg* of the Surma Valley. Khujai: a small jug used for holding water, and also as a drinking vessel; the same as the *lota* of the Surma and Assam Valleys; also made of bell metal. Korphu: a cooking pot; also made of bell metal. [see Pl. 1]. Pukam: a dish; the same as the *thal* of the Surma Valley and the *kahi* of the Assam Valley. Tengkot: a small cup; the same as the *bati* of the Surma and the Assam Valleys; also made of bell metal. Tukna: a large jug for carrying water.

BELL METAL.—Kardan: cymbals; the same as the *karatal* of the Surma Valley and the *tal* of the Assam Valley. [see Pl. 1]. Kudai Sel: an ewer. [see Plate 1]. Kwasen: a spittoon; the same as the *pikdan* of the Assam Valley. Senka: a *pán*-holder.

COPPER.—Kushi: a sort of spoon to hold water at *pujas*. [see Pl. 1]. Tami: a cup for holding water at *pujas*. [see Pl. 1].

The information available regarding the profits of the business are very meagre. Workers in bell metal are said to be able to turn out from 1 to 1½ maunds of utensils monthly, the wholesale selling price of which varies from ₹65 to ₹130 per maund, and the retail from Re.1-12 to ₹3-8 a seer. Their income is estimated at from ₹30 to ₹80, but this seems excessive.

The cost of the brass sheets used by the Morias in Dibrugarh is said to be 14 annas per seer, and the retail price of the manufactured articles from Re.1 to Re.1-1 per seer, if sold to Márwáris, and Re.1-2 if sold to the public. According to another estimate, the Morias buy their brass at ₹30 to ₹40 a maund, and sell their manufactured articles at Re.1-8 a seer, or ₹60 a maund. It is said that they can manufacture on the average two maunds weight of utensils a month. Consequently the smallest estimated monthly profit is Rs.16 and the highest Rs.60. The real income probably approximates more nearly to the former than to the latter figure. There is a certain amount of expenditure on implements and charcoal—especially the latter, except in jungly places, where the braziers make their own.

THE MANUFACTURE OF POTTERY IN ASSAM.

By Mr. E. A. GAIT, Director of Land Records and Agriculture, Assam.

There is an almost entire absence in the Brahmaputra Valley of the lower professional castes which are found in other parts of India. In the later days of Ahom rule, artizans were introduced from outside, and efforts were made to induce the people to learn different handicrafts. Some of them did so, especially people of the Kalita, Kewat and Koch castes, and the occupations thus adopted were gradually becoming hereditary, and functional endogamous sub-castes were slowly being developed, when the annexation of the country put a stop to the process. Thus, not only are there no regular professional castes engaged in the manufacture of pottery, brass-ware, &c., but the sub-castes who follow these occupations do not look on them as their only source of livelihood, and follow the ordinary agricultural avocations of the people, as well as the special handicraft which they have inherited from their ancestors.

There are two distinct classes of persons engaged in the manufacture of pottery in the Brahmaputra Valley, the Hirás and the Kumárs. (The word "Kumár" is derived from "Kumbhakár," and means "maker of pots.") The former were originally Chandáls, and, of all the functional sub-castes, they approach most nearly to the position of a separate caste. There is, however, no doubt of their close connection with the Chandáls: they still intermarry with them; they eat food cooked by them; they have the same *Patit* or *Barna* Brahmans as their *Purohits*, and they have no scruples in the matter of selling fish themselves.

The word "Kumár," on the other hand, so far as the Brahmaputra Valley proper is concerned, is not used to denote persons of any particular caste or sub-caste, but is applied to persons of several different castes (chiefly the Kalita, Kewat, and Koch) who make, or whose ancestors are remembered to have made, articles of earthenware. Thus, there are Kumár Kalitas, Kumár Kewats, and Kumár Koches, and the people so designated continue to retain their old caste status. (In Goálpára the Kumárs form a distinct caste, as in the Surma Valley). Within the caste, they rank equally with persons belonging to other functional subdivisions (*e.g.*, the Kámárs and Káshárs), but below those members of the caste whose occupation is said to have always been purely agricultural; the distinction, however, is by no means well marked amongst the Kewats and Koches, and is not a very firm one, even among the Kalitas in the western portion of the valley. A well-to-do Kumár Kalita of Kámrup or Mangaldai would have very little difficulty in obtaining a Bar Kalita bride, and his descendants would probably, in course of time, succeed in obtaining recognition as the equals of Kalitas who had never followed other than purely agricultural pursuits. Higher up the valley, it is said to be much more difficult for a Kumár Kalita to raise himself to the status of a Bar Kalita.

In a few rare instances, persons other than Hirás and Kumárs are found manufacturing earthen vessels in the Brahmaputra Valley. In the Tezpur subdivision a few Doms make large earthen pots, which are used for boiling *gur*; they rank equally with other Doms, and only make these utensils as a secondary occupation, their main means of livelihood being the catching and selling of fish. Near Dibrugarh, some few families of up-country men from Arrah are potters by profession. They are known locally as Hirá Kumárs. Some up-country potters have settled recently at Golághát.

In Sylhet and Cachar, the word "Kumár" denotes, what it does in Bengal, the separate potter caste, *i.e.*, one of the nine professional castes (Navasákha), which are said, according to the commonly-accepted Hindu tradition, to be descended from the offspring of Visvakarma, the divine artizan, by a Sudra woman. Members of the caste rank as Sudras, and Brahmans will take water from their hands and serve them as their priests. The Kumárs sometimes call themselves Rudrapál, in vindication of their claim to be descended from the beads of Mahádeva (*Rudráksha*). Some members of the caste go still further, and, dropping the Rudra, say that their proper appellation is Pál, or Káyastha.

Besides the Kumárs, there are in Sylhet some Musalman potters, locally known as Khuskis, who prepare the plates called *sának* for their co-religionists. The Khuskis are said to be endogamous; they are looked down on by ordinary Musalmans, just as are Máhimals or Muhammadan fishermen.

In the Garo Hills, pottery is made by persons of the same caste as the Kumárs of Sylhet; in the Khási and Jaintia and the Nága Hills districts the caste system is unknown, and there the business is carried on by any one choosing to learn the work.

In Manipur, the persons engaged in the manufacture of pottery are known as Luis, who are said to be the descendants of Kabui Nágas. Their status is below that of ordinary Manipuris, but there is no perceptible difference in their habits or manner of life. The articles manufactured in this province are not of any special interest, and consist chiefly of the rough utensils in common daily use amongst the people. The earth used is

generally a glutinous clay (*atha mati* or *alatiya mati*), but information on this point is not very precise or satisfactory. That used by the Kumárs of the Brahmaputra Valley is of a dark-blue colour, and is known as *kumar mati*; it is procurable without much difficulty in most parts of the country,—usually on the banks of streams. The Hirás use a peculiar kind of clay, which is more rare, and it is reported that in the whole of the Kámrup district there are only two places (Molong and Agiathuli) from which it can be obtained. This clay, which is called *hira mati*, is of a gray colour, and is very stiff; owing to this fact it makes better earthenware than the *kumar mati*, but the Kumárs do not use it, as it is not easily worked into shape on the wheel. The Kumárs sometimes use it mixed with *kumar mati* for making well rings, which are shaped, not on the potter's wheel, but on a form. The up-country potters of Dibrugarh are said to get their earth from ant-hills (*haphalu*).

In the Surma Valley and the Gáro Hills, the earth used is generally known as *murha* or *athali mati*,—*i.e.*, a stiff clay; but for some utensils, which do not require any very great strength, a lighter kind of clay, called *kali mati*, is made use of. The potters of the Jaintia Hills use two kinds of clay mixed,—one is of a dark-blue colour (*khyndew-iong*) and the other grayish (*khyndew-khluid*); these clays seem to correspond closely with the *kumar mati* and the *hira mati* of the Brahmaputra Valley. The Nágas use a bluish-black earth, called in Angami Nága *khegsa*, which is probably the same as *kumar mati*. In Manipur, as in the Khási and Jaintia Hills, two kinds of clay are mixed. One of these is black, and is called by the Manipuris *leital*, and the other is of a light-red colour, and is known as *leicheng;* four parts of the former are used to one part of the latter.

The clay is in all cases first well moistened in water, and all extraneous substances are carefully removed. Where two different kinds of clay are combined, they are mixed together very carefully. If the clay is of a very stiff nature, a certain amount of clean coarse sand is worked up with it. One object of adding the sand is said to be in order to prevent the articles made from cracking when being burnt in the kiln. In some cases, the pieces of old utensils powdered up, ashes, paddy husks, or some sort of fibre chopped up into small pieces, are mixed with the clay to add to the strength of the utensils made from it. In all cases, the clay is thoroughly broken and worked up, the feet being largely used in the process.

Method of Manufacture.—The Kumárs of both valleys use the potter's wheel for roughly shaping all the articles made by them, except well rings and flat or saucer-like utensils. A moistened and well-kneaded lump of clay is placed on the inner disc of the wheel, which is fixed horizontally, and is made to rotate rapidly. As the wheel revolves, the workman moves the lump of clay about on the disc, and gives it the desired shape. The superfluous clay is then cut off with a string, and the vessel is sun-dried for a time. When it has somewhat hardened, it is placed in a hollow mould made of wood or earthenware, which is sprinkled with sand to prevent the vessel from sticking to it, and is then made to assume its final shape by hand. The method adopted is to beat the exterior surface of the vessel with a flat wooden or earthenware mallet, held in the right hand, against a smooth, oval-shaped stone held by the left hand against the inner surface. When the required shape has been given to the vessel, it is again sun-dried, and the surface is then polished with a sort of earthenware pestle or (in Manipur) a piece of strong rag folded and moistened with water.

They are then sometimes coloured with red dust or cattle urine, after which they are ready for the kiln. In the Khási and Jhantia Hills the colour is given by a decoction made from the wild date pine, after the vessels have been taken out of the kiln, and while they are still hot. Flat articles made by Kumárs, such as plates, &c., and all utensils manufactured by the Hirás of the Brahmaputra Valley and the potters of the Khási and Jaintia and Nága Hills districts and Manipur, are roughly moulded on a flat disc of wood, and not on the wheel. The subsequent operations are the same as those already described. In the case of articles with narrow necks made by the Hirás, the practice is to make them in successive layers, each layer being partially dried before the next is added.

The following is a list of the rough implements used, with a description of each:—

1. The potter's wheel.—Assamese, *chak*; Bengali, *chak*. The diameter of the whole wheel is usually rather more than 3 feet. In the centre is a solid disc of tamarind or some other hard wood, some 13 inches in diameter, to which the outer rim is joined by four wooden spokes, each of which is about 6 inches in length. The outer rim, which is about 6 inches broad, is made of split bamboos, bound with cane and covered with a thick plaster of clay mixed with fibres of the sago palm (*chaur*); the object of this rim is to increase the weight of the wheel and thereby add to its momentum. An upright piece of *Nageswar* wood (*Mesua ferrea*) or *khair* (*Acacia catechu*), about 6 inches in length, supports the wheel; it is fixed firmly in the ground and is pointed at the upper end, so as to enable the wheel to revolve freely; a hollowed-out stone is let into the centre of the disc, where it rests on the point, so as to reduce the friction to a minimum. As already stated, the wheel is worked by hand, and revolves horizontally, the clay to be moulded being worked into shape on the disc as the wheel rotates. The earth under

the wheel is generally scooped away, so that the upper surface of the wheel may be on a level with the ground, on which the operator sits.

2. The rolling board.—Assamese, *aphari*; Bengali, *athal*; Manipuri, *kangoi*. A flat board, or earthenware tray, on which utensils are roughly shaped when the wheel is not used.

3. The mould.—Assamese, *athali*; Bengali, *athali*. A hollow sort of basin made of earthenware, about 16 inches long and 3½ inches deep, in which the final shape is given to all articles of earthenware, whether originally shaped on the wheel or on the rolling board.

4. The mallet.—Assamese, *baliya piteni*; Bengali, *baila*; Khási, *tyrnem*; Manipuri, *khuyaijei*; Nága, *jivu*. From 6 to 12 inches in length, used for beating the clay into its final shape against a stone held on the other side. It is made either of wood, stone, or earthenware. This implement is sometimes also used when kneading the clay before working it into shape.

5. The polisher.—Assamese, *chaki*; Bengali, *chaki*. Used for polishing the articles made, after they have attained their final shape and been partially dried.

6. The kiln.—Assamese, *paghali*; Assamese, *pain*. This is used by the Kumárs of the Surma Valley, and by some of those in the Brahmaputra Valley. The Hirás and others burn their earthenware in the open. In both cases alike, the vessels are carefully stacked, with layers of straw between them, and firewood or cowdung as fuel underneath. In the Brahmaputra Valley a stack of utensils is called a *thupa*.

The collection of the clay and firewood, the stacking of the utensils in the kiln or *thupa*, and the rough shaping of utensils on the wheel, form the men's portion of the work. The final shaping and polishing of the utensils is always done by the women, and when the wheel is not used, as with the Hirás, the rough moulding is also done by them.

The general opinion of the officers consulted is that the profits of the business are very small, the average earnings being placed at from Rs.4 to Rs.6 a month. It is difficult to estimate the exact earnings, as no accounts are kept by the potters, and they generally prefer to barter their wares in exchange for rice or paddy, instead of selling them for a fixed price. There is, however, no doubt that the earnings are less than they were some years ago. Brass cooking utensils are cheaper than they were formerly, and the standard of comfort of the people is improving, so that brass vessels are in most parts supplanting those made of clay. In Sylhet, the better class of Musalmans are taking to china instead of earthenware; and throughout the province, tin lamps and kerosine oil are taking the place of earthen *chakis* and mustard oil. Owing to these causes, the demand for earthenware articles is gradually falling off, while the trade is also depressed by the competition of foreign wares of a better quality, which are brought up in large quantities from Eastern Bengal, and more especially from the Dacca district. The decadence of the industry is not much to be regretted, as the articles made are of a very rough character, and less durable than those imported from Bengal, and the people who make them in this province are not inclined to learn improved methods.

The following is a list of the more important earthenware articles manufactured in Assam:—

BRAHMAPUTRA VALLEY.

Adkalah: small *kalah*; the same as the *hachi* of the Surma Valley. Akasbati: lamps used at marriages and on other festive occasions—*e.g.*, at the Dewali festival. Akathia: cooking pots, same as *dukathia*, but smaller in size; used for cooking rice or curry. Banmala: a *mala* (vessel) with a rim, in which curds, sugar, &c., are kept. Bhuruki: same as *mathia*, but smaller in size; used for storing grain. Chakali or Paticharu: these vessels are used for cooking curry; the difference between a *charu* and *chakali* is that the former is hollow, while the latter is less so, and flattened. Chaki: an earthenware lamp, with an open mouth, on which the wick lies; mustard oil is usually burnt in these lamps; the same as the *chata* of the Surma Valley. Charakdan: a hollow cylinder, about 20 inches high, used as a candlestick; the same as the *bogna* or *pradiper gacha* of the Surma Valley. Chilim: these are of two kinds, viz., *dhopat-khoa chilim* and *bhang-khoa chilim*—one is used for smoking tobacco and the other for *ganja*; the two are slightly different in shape at the top; those used for smoking tobacco are larger than those used for smoking *ganja*; the same as the *kalki* of the Surma Valley. Charu: same as *thali*, but of medium size; used for cooking rice; they are in use among the poorer classes who cannot afford to buy iron or brass utensils. Dama or Daba: earthen rings, on which hides are fastened to make drums. Daskathia: used for cooking rice, and intended to hold food for three or four persons. Gacha: a lamp stand. Ghat: water-pot used in *pujas*; the same as the *ghat* of the Surma Valley. Handi or Hari: a wide-mouthed pot largely used by Kacháris for cooking rice and brewing *mad*; the same as the *patil* of the Surma Valley. Jang: somewhat similar in shape to the *handi*, but longer; it is used by Kacháris for keeping water and *mad*. Juidhara: fire-stove. Kalah: a decanter-shaped vessel, chiefly used for holding water; also used for holding milk, *gur* (molasses), oil, &c.; the capacity is from 4 to 5 gallons; the same as the *kalas* of the Surma Valley. Khampti Haria: manufactured after a model given by the Khamptis for cooking their rice over steam; it is a drum-shaped pot, perforated at the base, and placed over another basin in which the water is boiled. Khola: resembles in shape a kalah, with this distinction—that it

has a wider mouth and neck, and is not quite so high; this vessel is generally used for cooking rice. Mala: a small *charu* used in religious ceremonies; the same as the *malsa* of the Surma Valley. Mala Charu: small trays for distributing eatables during festivals. Mathia: a large oval-shaped pot, with a comparatively narrow mouth, used for storing grain, and sometimes as a box in which clothes are kept; when used for the latter purpose, the mouth is closed by a cover, which is pasted over it. Mridanga or Khol: drums, larger than the *dama*, but made in the same way. Nad pat: well ring; the same as the *pat* of the Surma Valley. Nadia: a basin, something like a *charu*, but has a rim, and is stronger; used for keeping sweetmeats in. Nagara: small drum. Phuldan: flower vase. Piala, Beria, or Deg: a shallow "*khola*," with a much wider mouth; the neck is shorter than that of a "*khola*"; it is used for cooking purposes, as well as for keeping curds, salt, molasses, &c. Satar: same as *daskathia* and *akathia*, holding food for one person only. Sarai: a kind of tray on which presents are offered. Tekeli or Bhetua: the same shape as the *kalah*, but much smaller; holds from 2 to 4 quarts. Thali: big pots for preparing molasses, and also used for storing up water and cooking food in feasts.

SURMA VALLEY AND GARO HILLS.

Badka: a small jug used by Muhammadans instead of a *lota*. Bhetua: small earthen pot, used for cooking and other purposes. Bogna or Pradiper-gacha: stand for *chata*; the same as the *charakdan* of the Assam Valley. Chata or mallika: open lamp; the same as the *chaki* of the Assam Valley. Chilim or kalki: used for smoking purposes; the same as the *chilim* of the Assam Valley. Dhakna: a kind of plate or cover. Galas: a drinking-cup. Ghat: small pot for holding water, also used in Hindu ceremonies; the same as the *ghat* of the Assam Valley. Hachi: small *kalas*; the same as the *adkalah* of the Assam Valley. Kalas: a large jug for carrying water; the same as the *kalah* of the Assam Valley. Kasla or Dema: big earthen pot, used for cooking and other purposes. Kasi or Kai: a large plate. Khada: a kind of cup. Malsa: a kind of cup; the same as the *malah* of the Assam Valley. Pat: well ring; the same as the *nad pat* of the Assam Valley. Patil: small pot used for cooking and other purposes; the same as the *handi* of the Assam Valley. Piala: cup. Sharah: a kind of plate used as a cover. Sanak: a kind of plate used chiefly by Muhammadans to eat rice on. Sarai: a kind of jug for holding water. Tari: a small plate.

NAGA HILLS.

Li: this is the same in shape as the *likuno*, but larger, and is used chiefly for cooking rice. Likphu: this resembles a vase in shape, with a long contracted neck, terminating at the mouth in a fairly broad lip or flange; it is only used to carry water into the village; it ranges from 18 inches to 2 feet in height, and from 9 to 12 inches in diameter. Liki: this is of the same shape as the *likphu*, but larger; it is used only for the preparation of rice beer or "*su*." Likuno: this is about the size and shape of the ordinary brass *lota*, but having proportionately a larger mouth; it is used for cooking vegetables, &c. Setuli: a kind of earthern *korai*, used for roasting seeds, measuring from 10 to 20 inches in diameter. Tatseli: this is of the same shape as *li*, only larger in size, some being as much as 18 inches in height, and of about the same diameter.

KHASI AND JHANTIA HILLS.

Khewranei; *chattis* or *gharas*. Khew syntiw; flower pots. Kum: *gharas*.

THE LEATHER INDUSTRY OF THE PUNJAB.

By Mr. ARTHUR J. GRANT, Junior Secretary to Financial Commissioners, Punjab.

I. LEATHER-WORKING CLASSES—STATISTICS OF TRADE, &c.

The profession of working in leather, always unsavoury, is considered in India to be particularly unclean, and the persons engaged in this occupation have at all times in its history been looked down upon as a degraded class, in some cases actually outcast and excluded from participating with others in the rites of their nominal religion, and in other cases only admitted on sufferance to do so. Although it is impossible to trace with any certainty the origin and history of the class of leather-workers, still we can find out something as to their state and position in old times. At the period of the Institutes of Manu the rigidly exclusive principles of caste, as it became later on, were not yet established. There were, however, the divisions of the people into Brahman, Kshattriya and Vaisya (all pure Aryans), and the fourth class of Sudras which included aboriginal tribes and descendants of mixed marriages between the Aryans and the aborigines. In this four-fold division undoubtedly no one above the rank of a Sudra would have followed such a dirty and unpleasant occupation as working in leather. It is probable that the persons who actually undertook this kind of work belonged partly to aboriginal tribes and partly to the lowest class of descendants from mixed marriages. In the Institutes of Manu an attempt is made to trace the class of workers in each industry back to some particular hereditary origin. The class of 'káravaras' or leather-workers was held to be the issue of the mixed marriages of 'nishádas' with 'vaidihas,' thus representing a mixture of Brahman, Vaisya and Sudra. This derivation is of course merely fictitious, but it serves to show that leather-workers then, as now, belonged to a despised section of the community. Their humble descent and the degrading nature of their occupation combined to bring the 'káravaras' down to a very low position on the list of castes given in the Institutes of Manu, the only classes considered inferior to them being 'halálkhors,' 'chandáls,' sweepers, executioners, and 'cannibals.' In spite of their low rank, however, it is interesting to note that the annals of mediæval Hinduism afford an instance of a member of this class being singled out for individual distinction in the faith. This was Rai Dás, a Chamár, who was chosen as one of the twelve disciples of Rámanand and is revered as such by the Rámanandi sect of the Vaishnavas, while the Raidásís called after him are still the principal division of the Chamár caste.

After the time of Manu, the caste system became rigid and the leather-workers were stereotyped into a despised and outcast section of the community bound by blood and descent to a hereditary profession which was regarded as degraded and impure. Since then, however, caste organisation has again undergone great changes, and at the present time, though leather-workers continue to be looked upon as a low and menial class, still they share in common with all other ranks, in consequence of the relaxation of the rigidity of the old caste system, the possibility of raising themselves either individually or as a class to a higher position in the social scale. Caste was based at first upon the principle of community of blood. Then the principle of common occupation was recognised. Thus certain persons came to form a certain caste because they were engaged in the same occupation, not because they they were of the same real or nominal descent. But there still remained the notion of the hereditary nature of occupation, and until this was done away with, and while it was thought that the son of a tanner must necessarily be also himself a tanner, the bounds fixed to castes were as rigid and immutable as under the old fictitious theory of common descent. Eventually this last idea of the heredity of occupation also became relaxed, and now it is possible within certain limits for individuals or whole castes by changing their occupation and manner of life to remove themselves gradually from one rank to another and improve their position in the community. In the case of leather-workers, however, there are other obstacles which stand in the way of any attempt to rise in social rank, and which are the more difficult to be overcome as they are connected with religious prejudices which are so powerful in the East. Chamárs are impure in the sight of Hindús because they eat the flesh of cows and dead animals and work in leather, which is unclean; and the Sikhs, who are even stricter in their reverence for the cow than the Hindús, exclude them on the same grounds. But in spite of these difficulties the modern principle of the mutability of caste has extended even to the case of these classes. In the Punjab Census Report for 1881, Mr. Ibbetson says: "Among the artisan and menial tribes, the process (of changing occupation and with it caste) is common. One Chamár takes to weaving instead of leather-working and becomes a Chamár-Juláha; presently he will be a Juláha pure and simple; another does the same and becomes a Rangreta or a Bunia." The religious difficulty does not stand in the way nearly so much in the Western Punjab, and especially the North-West Frontier, where the population is Mussalmán, as it does in the East and South-East Punjab, where the people are nearly all Hindús. And it may be noticed that in some parts of the Frontier, as Dera Ismail Khán, leather-workers from down-country who have settled there have taken tone from their surroundings, and though they were originally Hindús have now nearly all become Mussalmáns. Changes in caste

among Mussalmáns represent little more than changes in social position, and are not accentuated by religious considerations. On this point Mr. Ibbetson writes: "In fact the difference between a Pathán who took to weaving on the frontier and a Rájpút who took to weaving in the Delhi territory would be precisely that between caste in India and social standing in Europe. The degradation would not in the case of the former be ceremonial or religious, nor would it be hereditary, save in the sense that the children would be born in a lower condition of life; but the immediate and individual loss of position would be as real as among the strictest castes of the Hindús. Thus we find men on the frontier of all castes engaging from poverty or other necessity in all occupations except those of an actually degrading nature." It is, however, noticed in a report now received from the Kohát district that Patháns who have taken to leather-working, though they retain the name of Pathán, are not able to intermarry with other Patháns who have not been connected with a menial occupation of this kind. In all parts of the Punjab there is undoubtedly growing up the modern feeling of toleration which recognises prosperity and allows respect to wealth wherever it may be found, and in Lahore and other places the heads of native firms of saddlers or shoe-makers, who are in a good way of business, enjoy a considerable degree of social position. A native Extra Assistant Commissioner gives a fancy picture of the rise in the social scale of a Mochí's family in the Punjab. He becomes well-to-do and calls himself a Khoja: his son gets on well at school: so the father, besides leather articles, keeps in his shop other small things such as pens, paper, knives, &c., and the boy is called "son of a merchant": the son passes his examination and becomes a "sheikh": now the father drops shoes altogether and sells a better class of article or turns contractor: and the son finally gets himself called "Khán Sáhib" and soon blossoms out into a "Sayyid," whose ancestors came from Afghánistán with Mahmúd of Ghazní.

INTERNAL TRADE.—The table given below shows the total figures for internal trade of the Punjab with other parts of India during the three years 1890—93:—

	1889—90.		1890—91.		1891—92.	
	Imports.	Exports.	Imports.	Exports.	Imports.	Exports.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Dressed hides	179,056	351,432	153,637	252,296	64,541	865,898
Raw hides	368,972	362,780	258,141	363,834	234,228	540,540
Dressed skins	94,129	1,283,300	63,989	1,695,928	58,266	1,286,910
Raw skins	141,056	1,137,074	123,081	805,105	193,726	1,326,782
Total	783,213	3,134,586	598,848	3,117,163	550,761	4,020,130
Manufactured Leather ...	804,337	871,024	820,209	2,041,050	1,166,284	2,633,700

II. LEATHER—PREPARATION AND MANUFACTURE.

The skins ordinarily used for tanning in the Punjab are those of the buffalo, bull or cow, sheep and goat. Besides these the skins of horses, asses and camels are sometimes worked up; and in special parts the skins of other animals also, such as the wild cat, fox, snow leopard, grey and brown squirrel, jackal, bear, karth, gural and barking deer, are occasionally made use of.

Buffalo hide is most esteemed for its strength. It is very durable, but it is too thick and stiff to be suitable for all kinds of work. It is most used for the thick soles of country-made shoes, and together with ox hide is also employed in harness-making and saddlery, in the manufacture of huqás, khopás, nárás, tobras, charsahs, petís, bokas, &c. Buffalo hides raw cost between Rs.4 and Rs.6, and when dressed they are worth Rs.5 to Rs.7. When sold by weight the raw hide fetches from Rs.10 to Rs.18 per maund, the price being less in the hot than in the cold weather, as the tanning is not then so certain. The following passage is extracted from a note on the Cawnpore Government Tannery:—

"Buffalo is the only available hide that will produce leather thick enough for harness work in this country; but there is no doubt that much of the inferiority of country leather arises from the poorness of the skin of that beast. It is poorly fed, not generally cared for, and usually killed when too old to breed or give milk. The hide of the male buffalo is too coarse and it gets such bad treatment in the plough or cart that it is generally full of sores and goadmarks. In large towns there is a market for buffalo beef for the low caste and poorer Mussalmán population, and also for grease, but the younger and better cattle are rarely slaughtered; it is from these slaughtered animals that the local tanners select their hides for the finer uses of harness, saddlery, and accoutrements. Many good hides are ruined by butchers in flaying from inefficient arrangements in the slaughter houses and from injudicious use of their tools."

The skins of bulls and cows are called 'goká.' The leather made from them is not quite so strong as buffalo hide leather, but is stout enough for most purposes. Raw skins of this kind fetch from Rs.2 to Rs.5, being on the whole slightly less valuable than buffalo skins. Dressed they are worth from Rs.3 to Rs.6 each. There is

sometimes a distinction made between the skins of bulls and cows, the former being considered tougher and rather more valuable. This class of hides is much exported to England and extensively used there for boot and shoe upper leather, for which it is much esteemed. Much damage is done to the hides by branding on the butts and shoulders.

Sheep skins are called 'meshá' and goat skins 'khal,' or together they go under the generic term of 'nárí.' The leather made from them is much finer and more supple than that from buffaloes' and bulls' hide, and is used for such purposes as making uppers of shoes, covering boxes and wicker work baskets, making bellows, stockings, gaiters, and book binding. Goat leather is esteemed much the more highly of the two, as it is stronger and more durable. Sheep and goat skins are bought up largely from village butchers and sweepers by the Khatíks who, as already noticed, are a special class whose occupation consists in the tanning of these kind of skins. They are also sold in considerable quantities by butchers to merchants from Delhi, who purchase them for the home market. The value of a raw sheep skin is from 6 annas to 12 annas, and when tanned they fetch only from 8 annas to Re.1 each. Goat skins are worth from 10 annas to Rs.1½ raw, and from Re.1 to Rs.2 when dressed. In Láhaul, where sheep are very plentiful, a prepared sheep skin is worth only 4 annas.

Of the other skins which are less commonly used camel skins are employed principally for making 'kuppás,' stout leathern jars, or for patching up holes and weak spots in other kinds of hides. For this purpose they are not regularly tanned. The skins are worth from Re.1-8 to Rs.3 only. They are also exported from some districts of the Punjáb to Lahore and Amritsar, where they are said to be used for packing tea exported for the Central Asian market. Horses' skins are said to yield a very thin and weak leather and are very seldom worth the trouble of tanning. They are worth from Re.1 to Rs.2 only in their raw state. Asses' skins fetch from 8 annas to Re.1 when raw. They are seldom tanned locally, but are sometimes sent to Delhi and Pesháwar, where they are made into shagreen. Deer skins are worth from 6 to 8 annas; leopard and bear skins from Kulu and Kángra about Rs.2-8 and Rs.1-8 respectively; barking deer about Rs.2; gural Rs.2; and karth Rs.3. These latter all come from Kulu. In Pesháwar are to be had wild-cat skins (known as 'soghar' and 'samor'), and fox skins (sháhzáda), many of which come from Russia. Here also snow leopard skins and skins of the grey and brown squirrel are sometimes brought in from Kábul. Foxes' and jackals' skins are sent in some quantities from Ráwalpindi to Pesháwar to be dressed there. Scented "Russia leather" is also to be obtained at Pesháwar at a price of Rs.20 to Rs.30 per skin, but it is not a local product.

The skinning of animals is generally performed by the butcher if they are slaughtered for food, and by the sweeper if they die a natural death. The method of skinning practised in the Punjab is as follows in the case of buffaloes or oxen. The carcase is first laid on the ground on its back; its legs are then held up and the hocks and hoofs are removed. A slit is then made in the skin along the full length, from the mouth to the tail; the skin on the inside of the hind-legs is also slit down to the root of the tail, and the skin of the fore-legs to the chest. The skin is then removed with a knife. When it has all been taken off one side the carcase is turned over and the skin of the other side is removed. The hide is then spread out on the ground and rubbed with salt, wood ashes or 'kalar' (saline efflorescence). It is then left to dry for a couple of days, being put in the sun in the cold weather and in the shade in the hot weather. The dried skins are then rolled up in bundles and put away in that state for sale or for future tanning. Sometimes, when the salt has been rubbed in, the skin is laid out flat on the ground, and a board ('chaukat') placed upon it so that the edges of the skin project all round. In these projecting portions of the hide holes are made, and a leather rope being passed through them, the skin is laced up tight on to the board. The board with the skin on it is then put up against a wall or some such place to dry.

In the case of sheep and goat skins, the method of skinning is first to remove the head and hang up by the hind legs to a convenient tree or a prepared tripod; slit open the skin on the inside of the hind-legs to the root of the tail; then draw the skin off whole, the hand alone (not a knife) being used to separate the skin from the flesh. A distinction is sometimes made between skins which have been removed by butchers and those taken off by village sweepers or Chamárs, the former being called 'qassábí' and the latter 'gánwárí.'

The process of tanning the different kinds of skins varies considerably, and a separate description of the methods employed in each case is necessary. The general features of the system of tanning bull and buffalo hide are similar all over the Province, but slight variations of treatment occur in some districts, mostly owing either to the presence locally of some particular product which has been found useful for tanning purposes and which is not available elsewhere, or else to the difficulty of procuring some of the ordinary materials for tanning as used in other districts. There are a large number of distinct processes in tanning a skin of this class.

The first process is to steep the skin in water (generally in a village pond or 'chappar') for about twelve hours to soften the skin. This helps also to remove the salt if the skin is one which has been dried and salted,

and is not taken 'green' from the slaughter-house. It is then soaked in a vat [called 'baingar' (Siálkot), 'vegar' (Ráwalpindi), 'nand' (Rohtak)] containing generally a solution of lime and 'sajjí' (carbonate of soda). For 'sajjí,' 'reh' or saline efflorescence is sometimes substituted. It remains in this solution some days to loosen the hair and to soften the surface of the skin, and should not be taken out until the skin becomes 'plumped up' and begins to be covered with a white fungoid growth, or as the natives say, until it becomes 'khamir' or ferments.

It is then taken out of this solution, and the third process is to remove with a 'fleshing knife' ('rambi,' 'ránpi,' 'khurpi'), the fat and inner skin ('jhilli,' 'gadúd,' 'chichra'). The outer hair is also taken off either with the same scraper or with a potsherd ('tikri') or piece of nitrified brick ('jhánwa'). The inner skin and fat which is removed is generally wasted, though it is sometimes employed as manure. It is never made use of in the Punjab for glue, as is done in England. Some dexterity is needed in removing the inner flesh, as the knife used has a sharpened edge, and a slip may shave too deep and cut into the hide.

The fourth process is to steep the skin, after being cleaned and scraped, in another vat ('nánd,' 'malni,' 'kún') containing the bark of the 'kikar' or 'bábul' tree (*Acacia arabica*). In the Hazára district the bark of the 'chir' (*Pinus longifolia*) is substituted for 'kikar' bark. Another variation also practised in the Hazára district is to substitute the leaves of the 'amla' (*Emblica officinalis*) or the root of the 'ber' (*Zizyphus jujuba*). The skin remains in this solution for three or four days. In the Gujránwála district, between the third and fourth processes as just described, there is an intermediate process which consists of steeping the skin in water mixed with leaves of the 'madár' (*Callotropis gigantia*) and 'pharwán' tree in order to remove all traces of the 'sajji' and lime. The fourth process is repeated three times, the skin being wrung thoroughly dry between each steeping and then placed in a fresh solution. The usual method of wringing a skin dry is to place it round a thick forked branch firmly embedded in the ground (called 'kasn'), and then twist it tightly with a stick so as to squeeze out all the moisture. These operations, which are gone through in order to remove all traces of lime from the skin, correspond to the English process of 'bating.' The use of lime in tanning is generally considered to be an evil, but a necessary one; it is not good for leather, but the hair and flesh must be removed, and there is no safer way of doing so. The plan of sweating the hides and producing partial decomposition, which is adopted in some places, would be too dangerous in a climate like that of India. After lime has done its work all traces of it in the texture of the hide have to be rapidly obliterated, and the process whereby this is effected in the English method is called 'bating,' the hides being thrown into a 'grainer' in which bran and water have fermented. The various mixtures described above as used for this fourth process take the place of the 'grainer.'

The skin after the third bath as above is washed, and then comes the fifth process. The skin is sewn up with 'munj' string in the shape of a sack and hung up on a tripod ('chará, 'trikáli') head downwards over a vat. The interior is then filled with the bark of the 'kikar' tree chopped fine, and water is poured on both inside and outside the skin. The mixture of water and bark is sometimes known as 'atura' or 'tarsa.' After some time (generally a period of about twelve hours), during which the skin has been kept constantly wetted, fresh water being poured in from the top as the old water trickles through the pores into the vat below, the skin is reversed in position, the opening which was at the top being sewn up, and a fresh small opening made in what is now the upper part of the skin-sack. The same process as before is now repeated, and this goes on for two or more days till the tannin has thoroughly penetrated the skin all over. During this watering process the same water is used over and over again, being taken up from the vat below as it drops into it. By this treatment the tannin goes right through the hide, but it has not time to make the chemical combination which, according to English ideas, is considered so essential for the leather. Tanning done in India on the English methods takes nine months to a year for a buffalo hide, four to six months for cow hides, and one to two months for sheep and goat skins. The above is a description of this process as generally practised, but there are many local variations and modifications of it in particular districts.

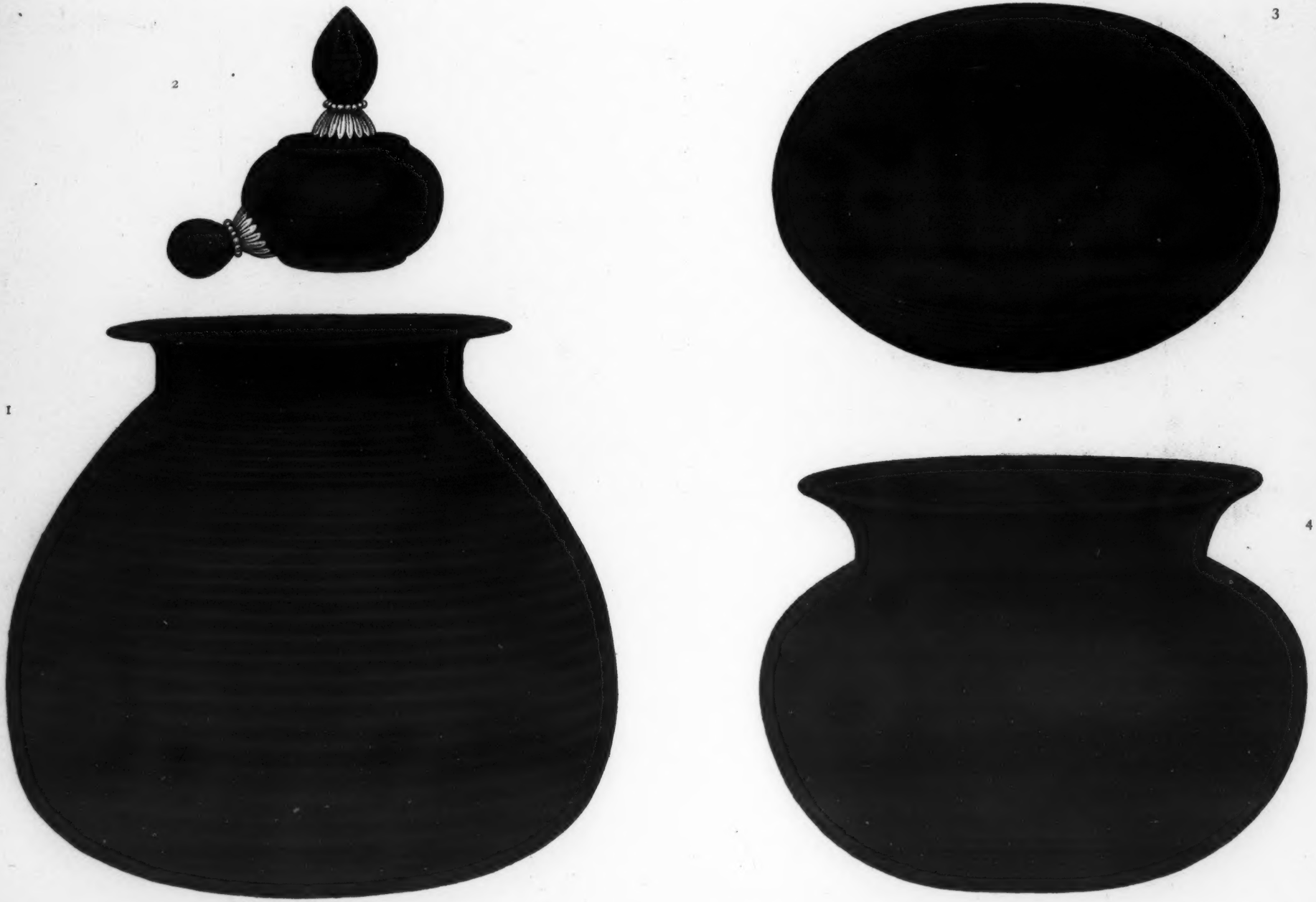
LIST OF ILLUSTRATIONS.

THE MANUFACTURE OF BRASS AND COPPER WARES IN ASSAM.—1. Metal Ware from Manipur. 2. Metal Work from Sylhet. 3 to 8. Metal Work from Assam.

THE LEATHER INDUSTRY OF THE PUNJAB.—9 to 22. Leather Work (various).

1.—METAL WORK FROM MANIPUR.

1. Korphu of brass.
2. Kardan of bell-metal, 1 pair with silk tassel.
3. Kudaisel of bell-metal.
4. Kushi of copper.
5. Tami of copper.



2.—METAL WORK FROM SYLHET.

1. Madhora of brass.
2. Chunati of bell-metal.
3. Dibi of bell-metal.
4. Batlai of bell-metal.

3.—Metal Work from Assam.

1. Banbati, with top.

4

2

3

4.—METAL WORK FROM ASSAM.

2. Banthal. 3. Bota. 4. Pandhoa.

5.—Metal Work from Assam.

5. Tál (two). 6. Tema.

6.—METAL WORK FROM ASSAM.

7. Brass Bera with a bell-metal Kahi on it. 8. Brass Chaki.

10

11

9

7.—METAL WORK FROM ASSAM.

9. Brass Don. 10. Ghagari. 11. Koria.

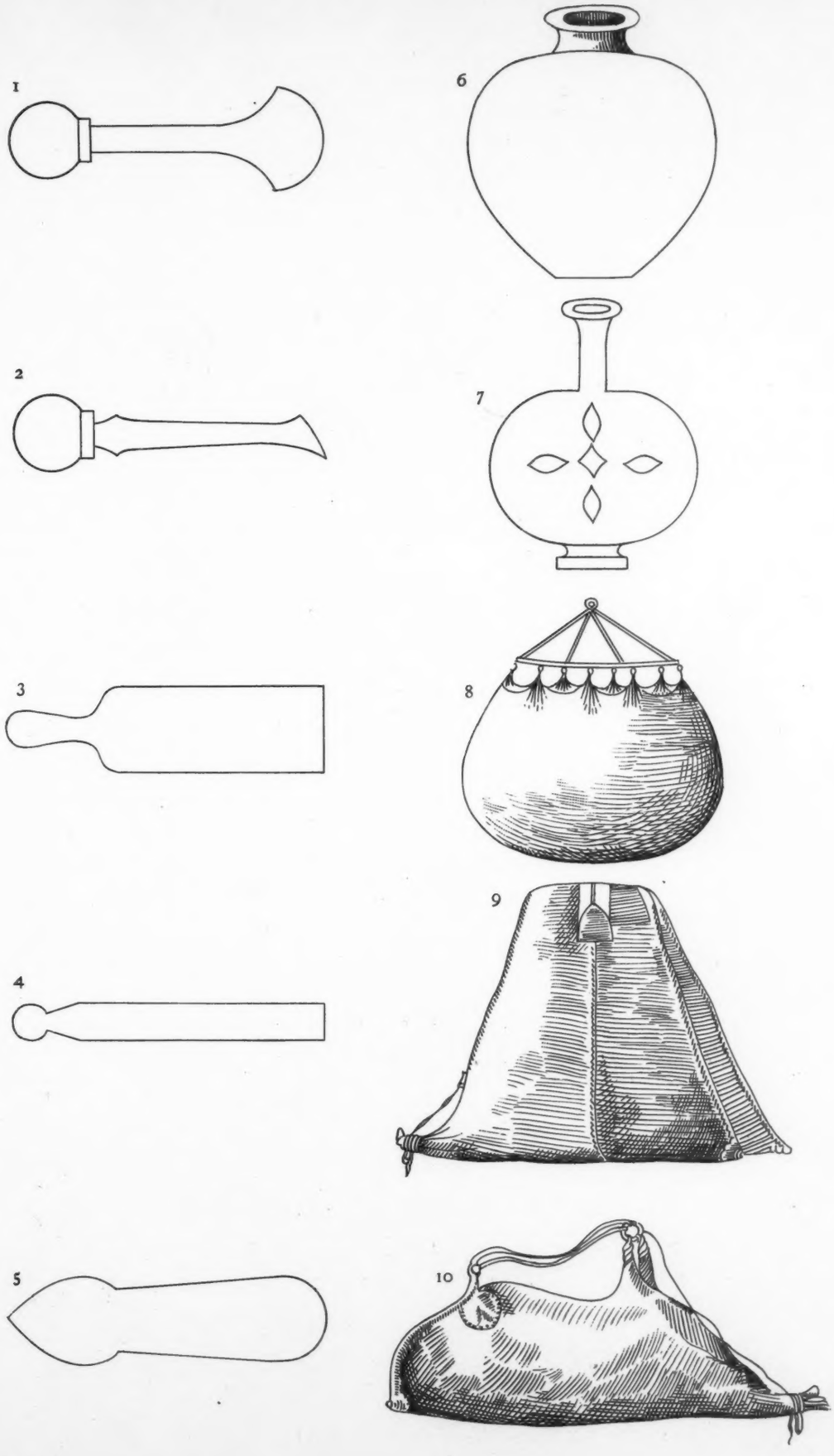
13

14

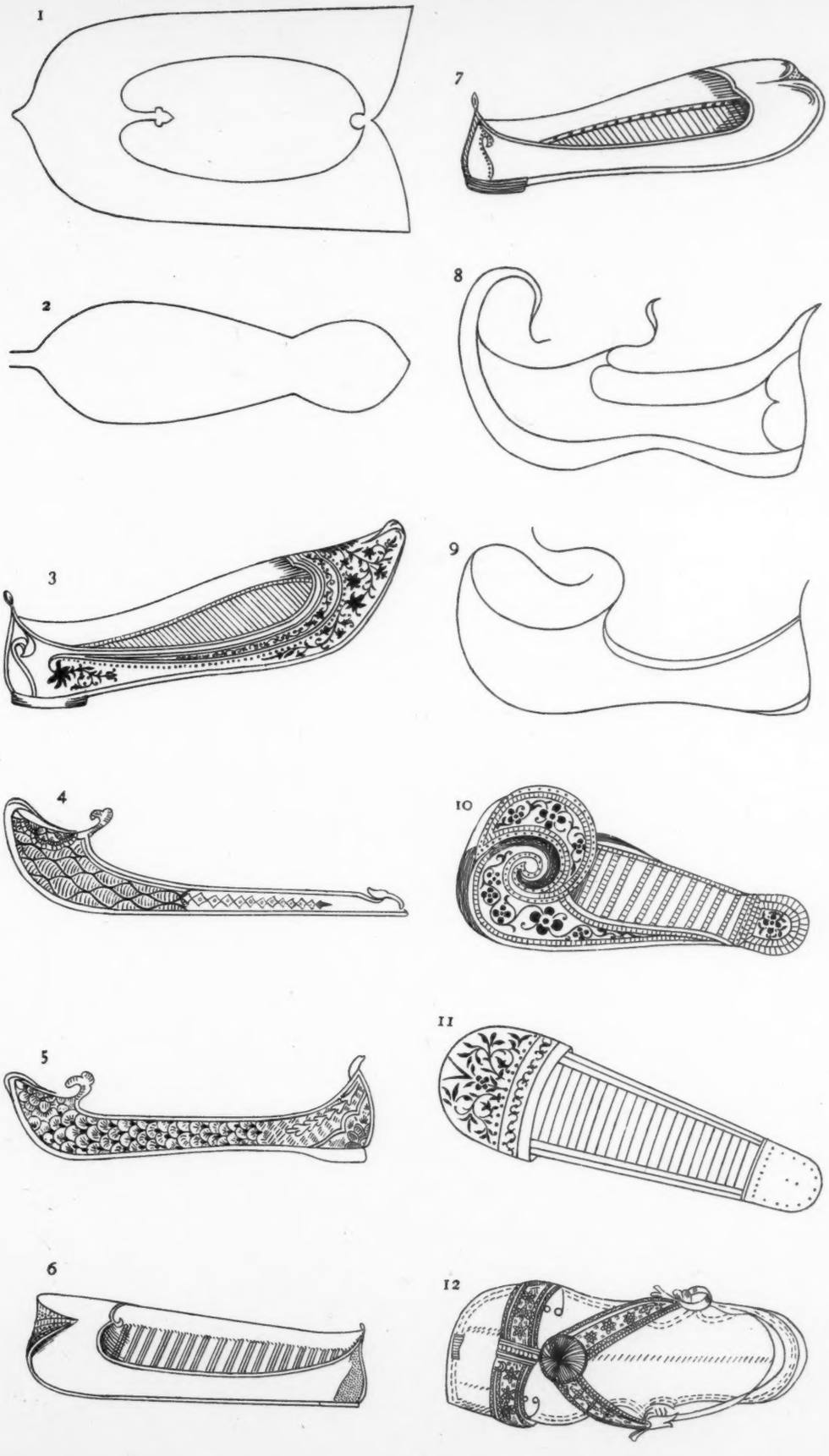
12

8.—Metal Work from Assam.

12. Khorahi. 13. Sorai. 14. Temi.



9.—1. Rambí, large. 2. Rambí, small. 3. Munglí.
4. Wyáng. 5. Kalbút. 6. Kuppá.
7. Kuppí. 8. Charsah. 9. Pakhál.
10. Mashk.



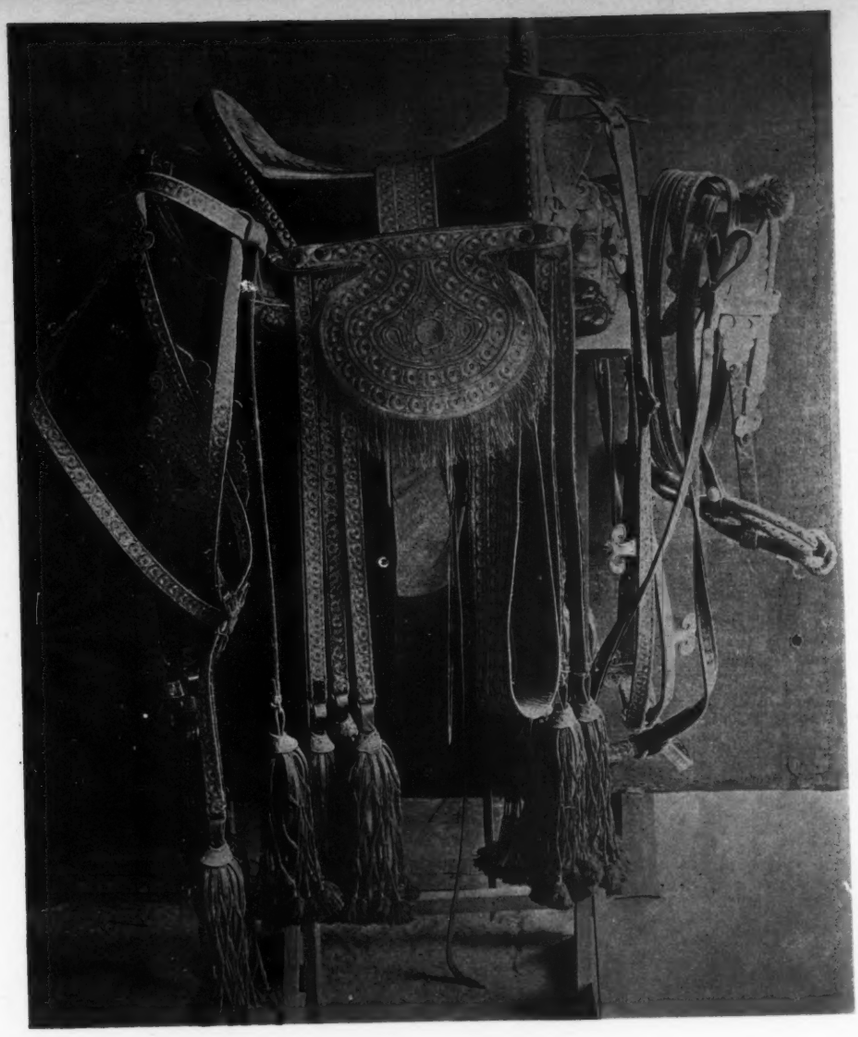
10.—1. Panna. 2. Talla. 3. Male salem sháhí (kámdár).
4. Ordinary female shoe. 5. Worn by females of high Musalmán families. 6. Golpanja, ordinary.
7. Golpanja for rough wear. 8. Pesháwarí. 9. Pothwár.
10. Ghetta. 11. Koff-pái. 12. Chaplí.

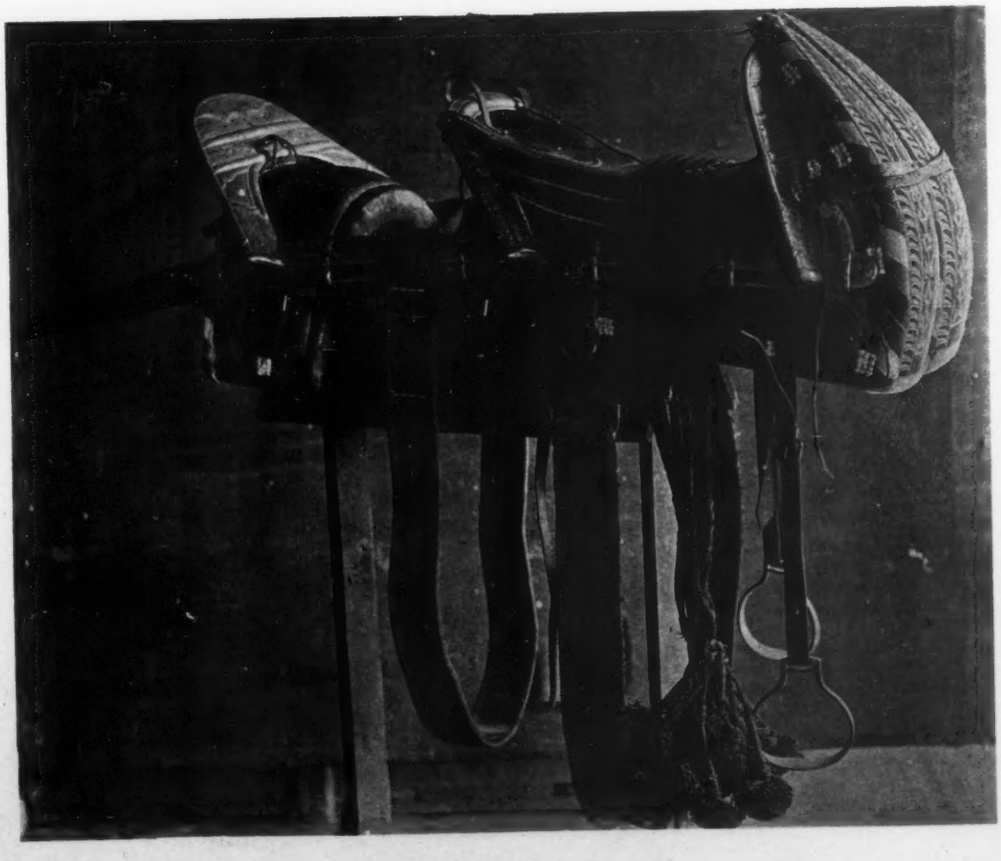
II.—SHOES MADE AT PESHAWAR.

12.—Shoes made at Delhi, Hoshiarpur, Rawalpindi, and Kangra.

13.—KUPIS MADE IN KHAIRPUR DISTRICT, MUZAFFARGARH.

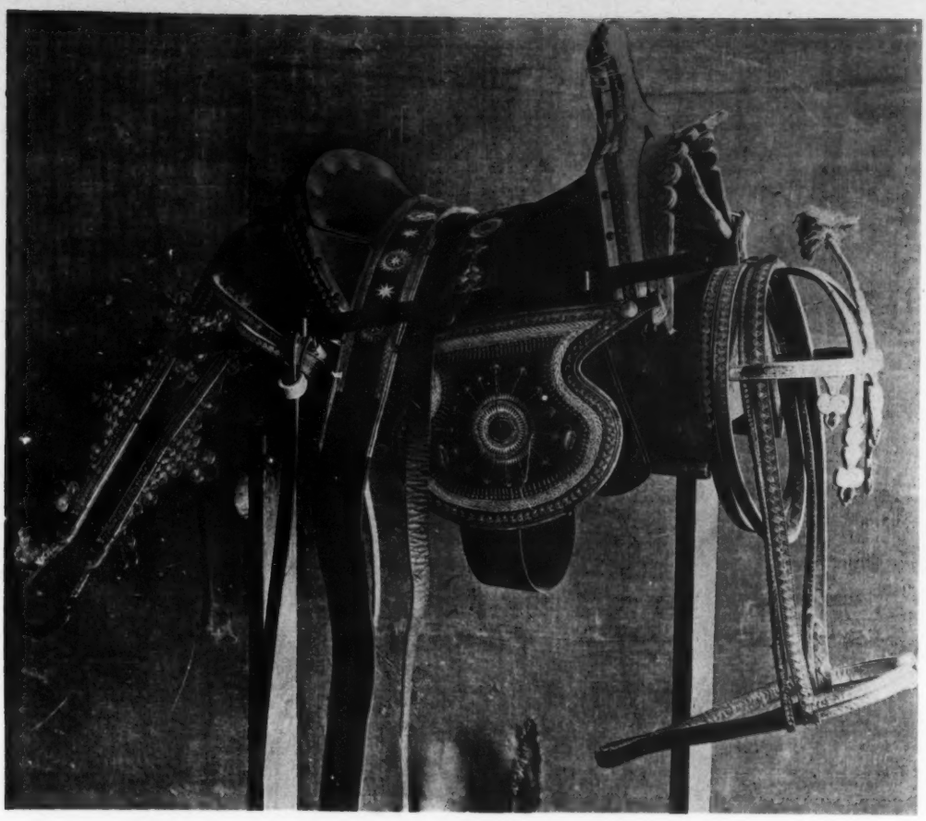
14.—Simla Quill and Leather Work.

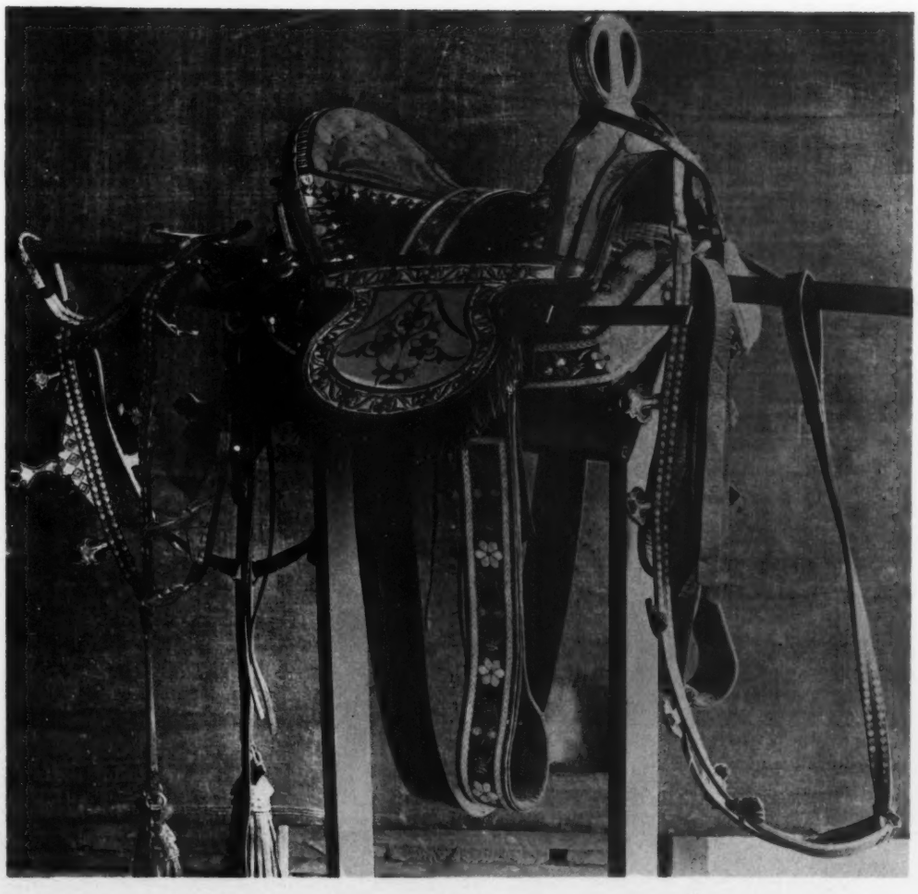




15.—Saddle made at Lahore.

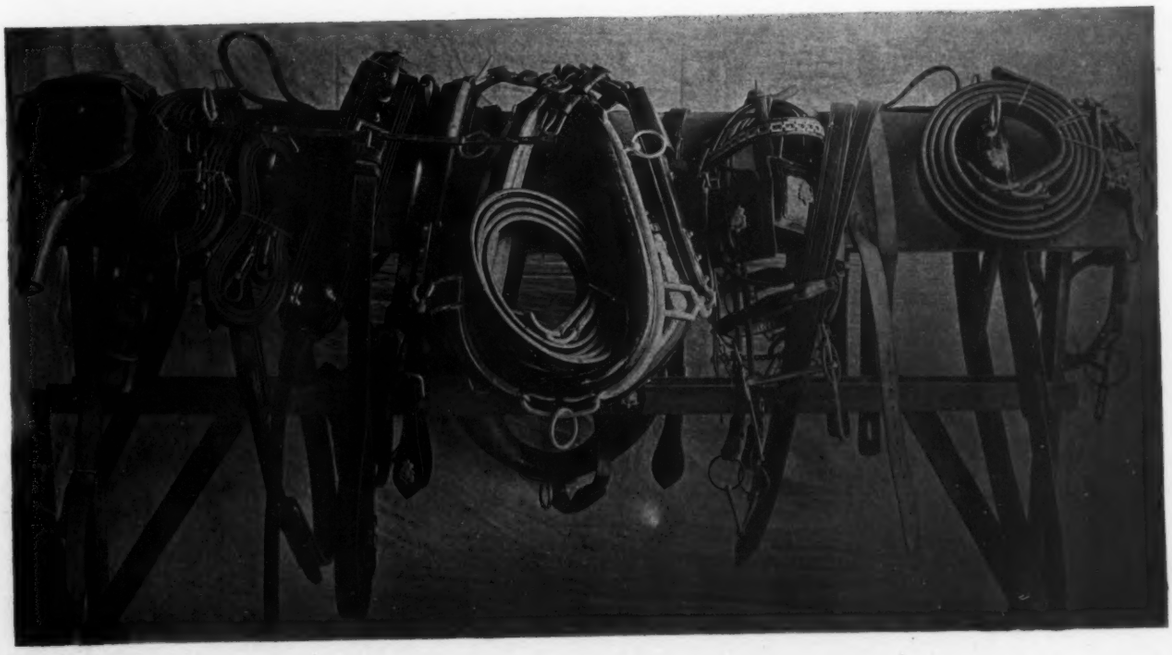
16.—Camel Saddle made at Hansi.





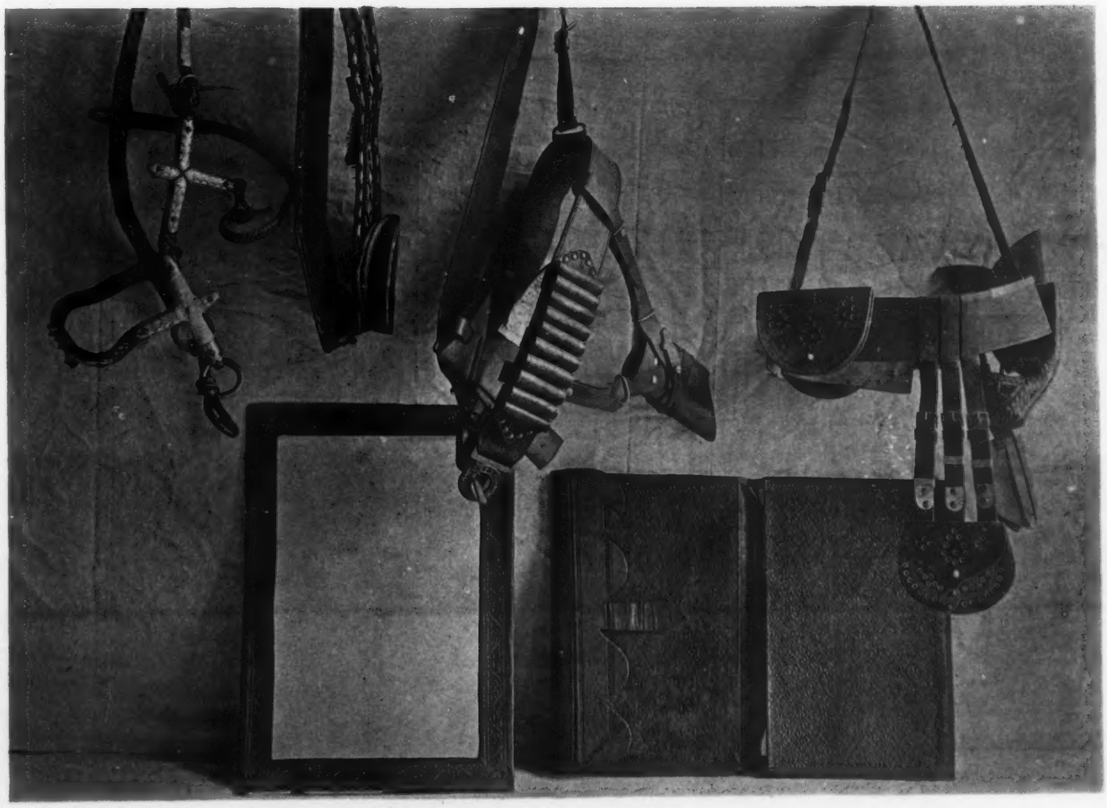
17.—Saddle made in Pindi Bhattian District, Gujranwala.

18.—Horse Saddle made at Ferozepore.



19.—Camel Saddle made at Hissar.

20.—Harness made at Lahore.



21.—Boka, Mashak, and Chagal made at Lahore.

22.—Belts and Portfolios made at Peshawar.

The Journal of Indian Art and Industry.

THE BRASS AND COPPER WARES OF THE BOMBAY PRESIDENCY.

By JOHN GRIFFITHS, Principal of the School of Art, Bombay.

The subject is divided into two main divisions, viz.:—(*a*) articles used for domestic purposes, and (*b*) articles used for religious purposes. Some of the articles in both these divisions are decorated more or less, but nothing is made, either for Hindu or Musulman, as is the case in Europe, simply for the sake of ornament apart from use. Every object, however highly decorated, is made for some useful purpose. But to meet a European demand, a large number of articles are now manufactured simply for ornamental purposes.

The food we eat and how to prepare it has engaged, perhaps more than anything else, the attention of mankind throughout all ages. With the Hindu his food and its preparation has become a part of his religion. Hence it is, he is so particular in the choice of utensils for its preparation, made of a material that can be readily cleaned after using. The very poor, not from choice but of necessity, use earthenware; but the well-to-do natives use wares made of brass and copper, owing to the facility with which these metals can be cleaned after every occasion on which they have been used. Even the very poorest cooly will save something out of his small earnings with which to provide himself with a brass *loti* (drinking cup), which accompanies him wherever he goes. It will be found that vessels of all sizes and varieties of shapes, such as *lotas* for drinking; larger vessels for carrying water and milk and for cooking food; trays, bowls, lamps, spoons; in fact, every article that is used for domestic purposes among the larger number of Hindus, is made of brass and copper, or both combined, when it is called *Ganga-Jamni*—a combination that they are very partial to, owing to the two metals so employed typifying the meeting of the Ganges and the Jumna at Allahabad.

Caste dinners on an extensive scale are given at the time of marriage and religious festivities, or on the death of a relative. On these occasions large copper and brass pots are used for cooking purposes. As the poor in every community form the majority, and as they, owing to their poverty, cannot afford to have in their possession the utensils necessary for the due performance of these ceremonies, wealthy persons keep a set of these pots in their houses, which are lent gratuitously to those who apply for them, on their furnishing proper security for the safe return of the pots after the ceremony is over. In villages where there may be no wealthy persons, the villagers raise a fund among themselves by public subscriptions, and so buy the utensils for common use. The utensils are kept in the custody of a person of trust, and, whenever they are required, they can be obtained by any member of the village community paying a small fee with his application, which goes to a fund for the purpose of repairing the damaged vessels and replacing those that are worn out.

These large caste feasts are not confined to Hindus only, but on certain occasions the Musulmans also hold them. Only the other day a well-known Bohora in Bombay gave the annual festival to his co-religionists on the completion of the period for mourning attending the Mohorum holidays. One of the daily papers mentions that the festival was attended by no less than twelve thousand Bohoras, men, women, and children. The day was observed as a holiday by the community. About four thousand women and children first sat down to dinner at about 1 p.m., and as the women were all zenana women, dinner was served to them by about 150 young lads belonging to the Orphanage in the Queen's Road. The women and children took dinner in groups of ten or a dozen from huge metallic plates. The men were afterwards entertained in parties of one or two thousand, just as it suited their convenience, and the dining lasted until about 9 p.m. The dinner consisted of *halva* (a sort of native confectionery), sweetened rice, curds, meat and salad; sherbet being provided for drink. The feast is estimated to have cost about ₹6,000, there being required for such a large banquet no less than 7,500 lbs. of meat, 100 maunds (2,800 lbs.) of rice, 150 maunds (4,200 lbs.) of ghee or clarified butter, and other articles necessary for cooking the same in their relative proportions. *Pan-supari*, which is always necessary to wind up a native dinner, was not neglected on this occasion. Some idea may be obtained of the immense number of copper vessels required to prepare and to serve food on such an extensive scale as here described.

Method of Manufacture.—Formerly the manufacture of brass and copper vessels was made from slabs of brass and copper, which were beaten out into rough sheets, and then hammered into the shape of the required

vessel. But this operation has now been completely superseded by the introduction of rolled sheets of about four feet square from Europe. The imports into Bombay of brass and copper sheets during 1893—94 are:—

Brass	...	399 cwts.	...	value ₹ 19,824.
Copper	...	145,551 ,,	...	,, ₹ 6,390,639.

Doubtless the whole of these imports are not used in this Presidency. These sheets are of several thicknesses, from that of a sheet of brown paper to half an inch. The thinner sheets from $\frac{1}{32}$ to $\frac{1}{16}$ of an inch are mostly used for making all the hammered articles for domestic purposes. Large pots from two to three feet high and five to six feet in diameter, similar to fig. 5, Plate 23, are made of copper sheets $\frac{3}{8}$ of an inch thick, and are used for cooking and for storing water. Large cylindrical vats seven feet in diameter and seven feet high are made of copper sheets half an inch thick, rivetted together, and used for distilling purposes.

Besides the dealers (*kasars*) who employ the workmen and supply them with material, there are four sets of workmen usually employed in making the ordinary utensils for every-day use in brass and copper, viz.:—(1) *Tambats*, coppersmiths who shape the articles; (2) *Kalaikars*, tinmen who tin the articles; (3) *Otaris*, or casters; (4) *Charkavalas*, workers on the lathe or polishers; and if the vessels are to be ornamented, a fifth set of workmen is introduced—(5) *Nakasha-wallahs*, or men who ornament. These several sets of workmen very rarely do the work of the other, so that in making a vessel it passes through several hands, a division of labour which is characteristic of the making of most things.

The operation of working brass and copper into the various shapes is as follows:—The sheet of copper or brass is placed by the workman on the floor, and on it he traces with a pair of compasses a circle of sufficient size to form the vessel he is about to make, and cuts it out with a pair of scissors. If the article to be made is a small one, such as a *lota* (fig. 14, Plate 24), it is hammered into shape from one piece of metal, beginning from the bottom and working up to the mouth; but if it is a large one, such as the *handa* (fig. 1, Plate 23), then it is made of two pieces with a joint at about the centre. Taking the latter for the purpose of description, the workman, having cut his two pieces of circular metal plates, takes one and softens it in a fire composed of charcoal and cow-dung cakes. He then hammers it into a hollow cup-shaped cavity in a piece of stone or wood (*adhi*), till the flat circular disc is made into a rough hollow form. The piece of metal is again fired, after which the workman proceeds to hammer it into the required shape first on an upright round-headed bar of iron (*sandan*) stuck in the ground, and then on a bent iron bar anvil (*kharvai*) which is fixed in a curiously V-shaped piece of wood (*paykhod*) (Plate 30), upon which the workman sits, gripping the article with his toes, as seen in Plate 31. This operation of alternately heating and hammering the metal is continued until the required shape is acquired, which goes to form the bottom of the vessel. The other piece of metal for the upper half is treated precisely in the same way. The two pieces are now taken and soldered together with brass, borax (*savâghi*), and chloride of ammonia (*Navasâgar*). To produce the finer joints of the more finished articles, silver is used instead of brass. When the soldering is complete the vessel is again hammered on the bent bar anvil, and is brought to the required form. It is then polished by rough scrubbing with a mixture of powdered charcoal and tamarind pulp, followed by hammering with a small hammer until the whole surface is covered over with a series of facets which reflect the light, and so produces, in a simple way, a very ornamental effect.

The vessel is now complete, and the larger number of articles for domestic use are made and finished in this way. Variously shaped hammers (*hatori*) and anvils (*kharvai*) are used to produce various forms, as shown in Plate 32. If greater finish is required, the article is put on the lathe and polished. A native lathe does not work very true. The vessel is fixed to the lathe with resin, and the wheel is turned by a cooly while the polisher sits on the ground close to the vessel, pressing against it, as it spins round, a sharp bent tool (*rándha*), which he rests on a small iron guide bar, and as often as not on his feet, which accounts for the wabbliness of some of the articles made (Plate 33). One *kalaikar* at Nâsik, named Gyanu, was, until lately, the only one who possessed an English lathe, and his work was truer and far superior, as regards finish, to any produced on the native lathe; and, consequently, his articles commanded a better sale and fetched higher prices. His specialities were small brass candlesticks and finger-bowls, and these, as specimens of turning, cannot be surpassed anywhere. He is now beyond work, being a very old man, but his two sons carry on the business. There are now three other English lathes in use at Nâsik, and to show the native's aversion to stand at his work, all three were provided with benches supported on iron bars screwed to the framework on a level with the top of the lathe, on which the workmen squatted—a position that would be intolerable to a European workman. Many of the smaller vessels, such as water-pots (*lota*), rose-water sprinklers (*gulab-pâsh*), scent bottles (*atardân*), and water bowls for pipes (*hûka*), are cast and afterwards turned on the lathe. The waste from the copper and brass sheets is used for making castings. The moulds for castings are made from the ordinary red earth, from which the pigment Indian

red is made, mixed with castor oil. For cleaning daily the vessels in ordinary use, ashes (*rakh*), sand (*reti*), or scrapings off the road, are employed.

The above description applies only to the making of the shape of the vessel. When it is required to be decorated, the ornament is either executed in (1) an incised line, or in (2) embossed work or *repoussé*. The first is usually applied to all cast work, and the ornament is simply incised into the metal with a chisel-headed punch and hammer, which produces a much fatter and richer line than that produced by the graver in English work. This kind of work is called "*chirella*" (one cutting), and if the metal is not of sufficient thickness to resist the blows of the hammer, the vessel is filled and rammed with black sand, which fulfils the same purpose as the core of pitch in embossed work. *Lotas*, chains, lamps, bells, and *huka* bowls are invariably ornamented by this method. When the second method (*repoussé*) is adopted, the vessel, if a small one, is filled with melted pitch (*kil*), and if a large one, with a mixture composed of resin (*ral*), pounded brick (*int*), and linseed oil (*tili*), in the proportion of 1, ½, and ¼. Before filling the vessel it is covered over with clay water or wood ash, so that in pouring in the mixture, if any should be spilt on the outside of the vessel, it can be readily removed. The vessel is then allowed to stand until the pitch has cooled and hardened, and so forms a hard core, into which the ground of the ornament is driven by means of small iron punches. The surface of the vessel is then covered with clay water, or thin paper is pasted over it, and when dry the design is drawn with pencil in outline, and this outline is then cut into the metal with a chisel-headed punch, and the paper or clay water removed by washing, leaving the design in a sharply-cut line on the vessel. With a series of small punches of different sizes and shapes—round-headed, flat-headed, chisel-headed—and a small hammer, the workman proceeds to develop the design by driving in the ground with a series of gentle taps, great care being required not to strike too hard, so as not to pierce the metal. The result of this operation will be that the design will appear in very flat relief. The operation is again repeated by driving the ground further in, when higher relief is obtained. The core is now melted out and the vessel is heated to soften the metal, and again refilled with pitch, the operation of hammering with the small punches being continued, both on the ground and the ornament itself, until the desired relief and modelling is acquired. When the ornament is finished, the pitch is removed out of the vessel as follows: A hole is dug in the ground, into which a pot containing cold water is put; the vessel is placed on its side over this, with its mouth over the pot of water. A fire of cowdung cakes is then lighted all round the vessel, which causes the pitch to melt and run out into the pot of water, which cools it, care being taken that the flow of pitch from the mouth of the vessel is continuous and free; otherwise, if the mouth be stopped up, an explosion may take place which will burst the vessel. The vessel is now polished. The old native method was to employ tamarind fruit (*chinch*) and water, rubbed on with the hand, and finishing with fine sand (*reti*), but now sulphuric acid (*tezab*) diluted with water, applied briskly with a brush, is used instead.

Brass, being more brittle and not so malleable as copper, is more difficult to work, and will not stand the amount of relief in the ornament that copper will. If very high relief in copper is required, it is beaten up from the inside, and finished in the ordinary way from the outside.

The large vase shown in Plate 34, which was made in the Reay Art Workshops attached to the School of Art, Bombay, is a good illustration of the manner of working in *repoussé*, and also shows the wonderful malleability of copper. The vase stands 3 ft. 1 in. in height without the cover, and is 2 ft. 10 in. at its greatest diameter. It is hammered into shape from two sheets of copper, $\frac{1}{16}$ of an inch in thickness. These two pieces form the top and the bottom of the vase, and the only joint occurs where these two pieces are soldered together in the centre, in the plain band above the lower row of small flowers. When filled with the composition forming the core, it was of great weight, and had to be worked on a coir mattress to prevent its being damaged when moved about. In taking out the composition in the manner already described above, the greatest precaution had to be exercised to prevent an explosion, which, if it had occurred, would, in addition to injuring the workmen engaged in the operation, have destroyed the labour of some months.

In addition to the large vase in Plate 34, specimens of ornamental work in copper and brass, executed at the Reay Art Workshops of the School of Art, Bombay, are given in Plate 35. These are designed and worked in the metal by lads of the coppersmith caste, from 11 to 16 years of age, who are trained by a master coppersmith, who is the best that could be found in the Presidency. Fig. 1 is a plate, the ornament for which has been designed and executed on the metal by a lad of only 11 years of age. Fig. 1, Plate 36, is a specimen of Cutch work in brass; and figs. 3 and 4, Plate 36, are examples of the coppersmith's art from Poona, which differ very little in character—except that the design and workmanship are better—from that of Cutch work. In the small village of Valvhan, about two miles from Lonouli, on the high road to the Karlá Caves, I found a solitary but very skilful coppersmith at work, having taken up his abode here with a view to catching the eye of travellers on their way to the Caves. Fig. 2, Plate 36, is a specimen of his work in brass. It is better in arrangement than

the examples from Cutch and Poona, which are overdone with ornament—a characteristic fault of nearly all modern native work.

A very common mode of decoration is to veneer wood with sheets of brass. Doors, window frames, columns, pilasters, string-courses, and railings of temples, are often treated in this manner (Plate 37). The wood is first carved in the usual way, and upon the carving are placed thin sheets of brass, which are first roughly hammered into the carving with a wooden mallet, and further worked with wooden punches, in place of the iron punches used in *repoussé*, as the latter would break the metal, until the brass sheets are developed into the form of the ornament beneath. Their edges are secured to the wood by nails.

Many of the gods and the bulls (*nandi*) in the temples are first carved in stone or wood, and afterwards covered with sheets of copper, which are hammered into form as above described. The more wealthy temples use silver, and some even gold. At the temple of Pârbatî, near Poona, is to be seen the head of Mahâdeo worked life-size in silver, the moustache, eyebrows, eyes, and hair being painted in their natural colours; also the large bull (*nandi*) of black basalt, in front of the temple, is, on certain days, covered over with silver sheets, which have been rudely worked into the form of the animal.

PLACES OF MANUFACTURE.

In the Bombay Presidency brass and copper wares are now principally made at Nâsik and Poona, although a considerable quantity is made at Ahmedabad. In most of the other towns of the Presidency, brass and copper wares are made in a small way to meet local requirements, but the best workmen gravitate naturally to where the industry is thriving, as at Nâsik and Poona.

Nâsik.—The Nâsik wares are preferred to those of Poona, owing to their superior finish. At the several fairs that are held annually in different parts of the city of Bombay, is exhibited for sale a large quantity of brightly polished pots of all sizes and shapes, from the diminutive ones of the children's toys to the larger ones of the grown-ups. These seem to spring up like mushrooms in a night, and disappear again in the same mysterious manner. On enquiry as to where they come from, the reply invariably is—from Nâsik. Nâsik being a place of pilgrimage, many Hindus visit it for religious purposes, and when they return to their homes they take with them a number of brass and copper pots as presents to their relatives and friends. At the thread and marriage ceremonies among the Hindus of the higher classes, a set of copper, brass or silver pots and cups are given to the boy who is to wear the sacred thread, and to the bridegroom. A great demand is thus created, and the industry is well supported, giving work to a large number of workmen, both Hindus and Musalmans. I found that the latter worked entirely in brass.

The system of working pursued at Nâsik is precisely similar to that carried on at Poona, viz.: that of one set of workmen being engaged in making only one pattern of vessel. I visited about one hundred copper and brass workshops, and in not a single instance did I find ornamental work of any kind being executed. On enquiry as to who made the ornamental *lotas* which were so common in former days, I was told that none were now made, unless to order. All the workmen were engaged in hammering, casting and turning articles entirely devoid of ornament, and yet Nâsik has always had the reputation for producing articles that were noted for their ornamental work. Poona I found to be the place where these things are now mostly made.

The other day, while at Nâsik collecting material for this monograph, I came across an old man, half blind, but still capable of doing good work. His occupation was to make small images in copper and brass, and other small articles used for family worship; and the few he had in his store showed that he was a workman of no mean skill. His workshop, unique in its simplicity, was about 6 feet square and 7 feet high, with the front open to the street; so that the passers-by could stop and have a chat, and watch the old man at work, as he had no trade secrets requiring him to hide his work from his fellow-men, for he trusted to his skill in execution for success. A green parrot in an iron wire cage, suspended to the beam across the shop front, was his companion, and now and again broke out into short ejaculations in Marâthi. On the wall, close up to the ceiling, were hung two highly coloured pictures painted on glass; one representing Indra on the seven-trunked elephant Iráwat; and the other, Shunker or Shiv, with his wife Pârbatî, and his son Gânpatî. In a small niche in the wall was the old man's shrine, in which he had a clay figure of Ganesha, the elephant-headed god of knowledge—for did he not want knowledge?—in front of which was a small *lingam-yoni*, and a few other—to him—sacred emblems, which were carefully protected from dust by a glass door. On a small shelf in front of the shrine were leaflets from the *Shastras*. In this confined space, little more than a cupboard, the old man pursued his vocation from day to day, with an unshaken belief in the gods and emblems of his ancestors, and with his mind unruffled by the new-fangled ideas and babblings of Congress-wallahs. His appearance was weird and picturesque. With nothing on his head save the long tuft of grey hair (*shendi*) hanging loosely at the back, his sacred thread (*janwa*) depended from

his left shoulder, his iron-grey moustache, his chin studded with a bristly growth of white hair three or four days old, his eyes bleared, his back bowed, and his tawny-coloured skin loose and wrinkled by age; there, cross-legged on the floor, he sat on a piece of matting, clad only in a waist-cloth, with his small square-topped anvil stuck in the mud floor in front of him, and the rest of his simple tools around him—a subject for a picture that would have delighted Gerard Dow.

Among the articles that he showed me were two ornamental brass tree-like stands for the purpose of holding small incense tapers during the time of worship, which he considered to be his *chef-d'œuvre*, and which he had made—he being a native of Baroda—for His Highness the Gaikwar. The old man told me, with evident grief, that, as His Highness was at present in England, he was afraid, owing to his great age, he should not have the gratification of presenting them to him. I had seen similar articles in Poona (Plate 29, fig. 3), but they were not to be compared to them as regards design and workmanship.

If any one desires to have a vivid impression of the remarkable use made by Hindus of vessels of every description in copper and brass, they should pay a morning visit to the bathing *ghât*, on the banks of the Godâverî at Nâsik. There thousands of Hindus—men, women, and children—are assembled; some performing their ablutions, some cleaning their vessels, others crowding down with empty pots to clean and to fill, and others departing with majestic gait, carrying their vessels filled to the brim, and piled one upon the other on their heads —a scene once witnessed will never be forgotten. And this has been going on, daily, for hundreds of years.

I believe it is owing to their continually carrying pots of water on their heads, that give to the women of this Presidency the magnificent upright carriage which characterizes them. From their very earliest childhood they begin to carry vessels, which they balance with remarkable grace, on their heads. I have seen women carry on their heads as many as three, placed one on the other, of the largest copper pots filled with water, similar to that shown at fig. 1, Plate 23. To see a Gujarâti woman with these large vessels balanced on her head, walking along with a swinging majestic gait, is like looking at one of Michael Angelo's women. The milk-woman (*dûdh-walli*) is a picturesque figure with four or five brass *lotas*, piled one above the other, balanced on her head and gradating upwards in size, from the large one to the small one on the top, which is used as a measure (Plate 23, fig. 13).

Poona.—A noted feature in the copper and brass manufacture of Poona is the introduction from England of machinery worked by steam power. "The Poona Metal Factory" was started in 1889, and is under the management of Mr. Anandrao Bhau, a coppersmith by caste, and a man of considerable intelligence and application. His father—and after his death, he, himself—was anxious to improve his caste trade, and, with this object in view, he has started, with the assistance of his friends, this factory, which is entirely worked by native agency. A number of lathes on the native principle; machines for cutting the metal into round discs; machines for punching the discs into the required shape; machines for trimming and turning the edges of the vessels previous to finishing them on the lathe, were at work, and all were driven by steam power. Over little charcoal fires, through which a blast was forced by machinery, were a number of workmen engaged in annealing the pieces of metal. The wastage or cuttings is sold to persons who cast articles, such as lamps, chains, images, &c. Mr. Bhau makes his own punches to turn out the patterns mostly approved by native taste. Although the articles turned out are small in size (as the machinery is not adapted at present for larger ones), the outturn is far better than the hand-made articles, having greater accuracy and finish, and produced with a considerable saving of time and labour.

The following articles are made in the factory, thousands of each pattern being turned out:—*tamhan* (Plate 28, fig. 3), *tat*, *vati* (Plate 24, figs. 3, 12, and 13), *rampatra* (Plate 26, figs. 1 and 3), and *lota* (Plate 28, fig. 6).

It appears that there is a very large trade in the importation of teacups and saucers from Germany, made of German silver for the use of Hindus, owing to the prejudice they have against using porcelain. Mr. Bhau is now preparing dies for making these.

There are several workshops in Poona where copper and brass work is executed; each workshop being noted for manufacturing one particular set of articles and doing nothing else. For instance, in one the workmen make nothing but the larger vessels for cooking and carrying water; in a second, the smaller and more delicate articles used for the purpose of family worship, such as small images, incense holders, *pan supari* boxes, &c.; in a third, nothing but lamps are manufactured, which are usually cast in three pieces—the top for oil and wicks, the centre column, and the base; these three pieces are finished on the lathe and by filing, and then screwed together (Plate 38, figs. 4 and 5). One workshop is noted for the manufacture of oblong brass boxes, which are cast in the first instance, and then finished by filing and burnishing; and another for making sham jewellery in brass,

for which there is a considerable demand among the lower classes of Hindus (Plate 39). At one place hundreds of small bells, strung together and hung round the necks of bullocks, were turned out (Plate 26, fig. 3*a*).

BOMBAY.—In Bombay, the copper bazaar in Momba Devi Road used formerly to present a busy scene, accompanied by an almost deafening noise and din, pertaining to the hammering of copper and brass; but now this is all changed, owing to the fact that the greater part of the wares, with few exceptions, are now imported ready made, and one only hears occasionally the clanking of the vessels as they are put into the scales for a purchaser. The bazaar, nevertheless, is remarkably picturesque, with each little shop filled with articles of every shape and description, all aglow with reflection, either of the yellow colour of the brass or reddish colour of the copper. Here will be found the smaller and larger vessels used for cooking, and for carrying and storing water, made in another part of the city; bullock bells and chains from Surat; beautifully turned pots from Nâsik and Poona; brass *huka* bowls from Sind; *lotas* engraved with ornament and figure subjects from Benares; perforated brass boxes from Jeypore; and large brass trays, with floriated patterns, from Calcutta. The places of manufacture in Bombay are Kasar Gali, Mugbhat Gali, and Fanaswadi. Here the din from hammering is deafening where some hundreds of workmen may be seen at work in making vessels for domestic use only.

AHMEDABAD.—Large quantities of copper and brass articles are made in Ahmedabad. Besides the ordinary utensils used for domestic purposes, the Ahmedabad coppersmiths (*Kansárás*) can make, when required, very effective screens of elaborate geometric patterns of perforated panels in brass, after the manner of the perforated stone screens of the old buildings. Another speciality is the betel-leaf holder (*pándán*), a small box of the most delicate brass tracery, carried on the person (Plate 27, fig. 7); also boxes for keeping jewellery, inkstands, boxes for holding sweets and spices, rings, lamps, idols, bells, chains, and tongs. The raw material, copper and brass, is brought from Bombay by Musulmân dealers of the Shia or Dándi Bohora sect, and sold to the coppersmiths. Electro-plating on copper is, to a small extent, carried on here; and the process has completely supplanted the old method of covering the copper with silver leaves. Horse trappings for marriage processions are electro-plated. The odd thing about it is that electro-plating is carried on by platers (*rasániás*) of the shoemaker (Mochi) caste.

KOLABA.—Mr. Lamb, the Collector of Kolaba, states that the manufacture of copper and brass pots is gradually on the decline; pots are imported from Poona, Nâsik, and other parts of the Deccan to a greater extent than before. In Alibâg there is a considerable trade in teapots. About 3,000 pots made of copper are manufactured every year, and sent for sale to Bombay and other places, each costing from 15 annas to ₹1 - 8. With regard to this matter, Mr. Sinclair, the Collector of Thana, and formerly for many years Collector of Kolaba, says that nothing worth calling "artistic" brass or copper ware is manufactured in either the Thana or the Kolaba District; but many of the familiar forms of vessels are graceful enough. Both Districts depend, for the larger and better classes of metal vessels, on Bombay. As regards the inferior vessels, on the other hand, they are sometimes manufactured in Alibag and in other places almost suburban, and sent into Bombay. The reason of this assigned by the makers is that an inferior workman can live cheaper in these places, and work at a lower rate. A first-rate workman, on the other hand, finds a better demand for his costlier productions in Bombay, and can get a good living wage there. This tendency of inferior handicraftsmen to be first driven to suburbs is to be noticed in all manual skilled labour in all great cities.

AHMEDNAGAR.—In the Ahmednagar District only the ordinary culinary utensils are made, with the exception of Sangamner, where one man, whose work is above that of the ordinary run, makes betel-nut scissors and handles for fans, which exhibit much skill and taste (Plate 27, figs. 2 and 4).

SATARA.—Shirala is still the centre of the brass trade in the Satara Collectorate, where articles are cast—not wrought—in brass, of the value of ₹1,000 to ₹1,200 every year.

SURAT.—At Surat there is a pretty large manufacture of brass and copper plates or trays (*thali*) chased with conventional designs, mostly of flowers and leaves. They are often plated with tin, or silver. These articles are in fairly good demand by Bhoras and other Musulmâns, and are exported to Sind and elsewhere.

Brass rods, with designs embossed on them, are used for bending into armlets and wristlets, the edging of plates, and the like. They also are often plated with tin, silver, or gold, and are largely exported to Sind and the Punjab.

SIND.—In nearly every division in Sind brass and copper wares are manufactured for domestic purposes. Shikârpur has the reputation for making brass hubble-bubbles (*kali*).

KHANDESH.—Copper and brass were formerly imported in blocks, and worked first into sheets and then into utensils, but now ready-made sheets are largely imported from Bombay. Most of the copper work made in Khandesh is for domestic use, and very little is made of an ornamental character. The coppersmiths of Songir, in Dhulia, and of Faizpur, in Sávdá, are skilled in making gongs and bells.

BARODA.—Dabhoi and Kadi, in the Baroda State, are noted for their copper and brass wares in ordinary use among the natives, on account of their high finish and the elegance of their forms; and those made at Visnagar are much prized, and many of them are exported to Ahmedabad and Káthiáwár.

DHARWAR.—Hubli, in the Dharwar District, turns out a large quantity of copper and brass articles used for domestic purposes, for local supply, and for exportation to Belgaum, Bangalur, Belari, Kolhapur, Sholapur, Raichur, Mangalur, &c. Besides the ordinary copper and brass vessels, bells and gongs are made from bell metal (*khanchu*), a mixture of copper and lead, or tin.

KOLHAPUR.—Brass work of a superior quality is made at the Technical School, Kolhapur, in addition to the ordinary utensils, such as pots, lamp-stands, bells, &c., made by coppersmiths in the town.

SANGLI.—Sangli has the reputation for turning out good copper and brass work—both polished and turned.

THE MANUFACTURED ARTICLES.

The following are some of the articles in use (*a*) for cooking purposes; (*b*) for carrying and storing liquids, or drinking from; (*c*) for the toilet; (*d*) for carrying and serving betel-nut or *pan-supari*; (*e*) for religious purposes; (*f*) and for lighting:—

(*a*) For cooking purposes: *Patele*, a cylindrical copper or brass pot with slightly rounded bottom, varying in size from two inches to five feet in diameter; used for cooking vegetables and curries, and also for storing water; it is likewise used for storing sweetmeats, and rows upon rows may be seen in the bazaars in the sweetmeat sellers' shops, filled with every variety of native confectionery; it is the cooking pot tinned, in use also in European kitchens, in India. *Tapele*, something in form like the *lota*, from three inches to four feet across; the small ones are used for boiling rice and holding milk, and the large ones for storing water (Plate 23, fig. 5). *Kadai*, a hemispherical vessel with two handles, used as a frying pan. *Roli (rovali)*, a cylindrical pot about nine inches in diameter and a foot in depth; the sides are perforated with holes, so that it acts as a sieve, and is used for washing rice. *Parat*, a large circular dish, from two to five feet in diameter, with a rim about two to four inches high, principally used for carrying cooked rice or vegetables from the cook-room to the dining room. *Pali*, a large brass spoon with a handle two feet long; used for serving vegetables. *Karanda* or *modak patra*, a dish composed of three pieces, for stewing *modaks*, *shengas*, and other dainties. *Zara*, a circular flat strainer, with a handle about three feet long; used for frying *bundis*. *Velani*, a dish about one foot in diameter, with or without a handle; used for serving rice in small quantities (Plate 24, fig. 10). *Ográle*, a round-bottomed cup with a handle, very like a saucepan, used for serving rice or vegetables. *Tat*, a polished brass dining dish. *Koshimbarichá ghad*, a set of seven brass cups; six united together, by their sides, round a centre one, so as to form one article, with a handle over the top; used for serving *koshimbris* (pickled fruit and vegetable).

(*b*) For carrying, storing liquids, and drinking from: *Handa* (Plate 23, fig. 1), *ghagar* (Plate 23, fig. 3), *kalasi* (small *ghagar*) (Plate 23, fig. 6); used for carrying and storing water. *Pohara*, a copper pot with a long piece of rope attached to it; used for drawing water from wells (Plate 23, fig. 2). *Surdhi*, used for carrying water. *Lota* and *loti*—the first is applied to a large pot, the second to a small one—are made of copper or brass, or a combination of both, and are universally used by Hindus for carrying and drinking water (Plates 26, fig. 8; 24, fig. 14; and 28, fig. 6). *Panchpatri*, a cylindrical cup with a rim (Plate 26, fig. 12); *piyala*, a cup (Plate 23, figs. 4 and 7) with a stand (Plates 24, fig. 7; 26, figs. 4, 5, 6); *rampatra*, named after Râm, the deified king of Oudh (Plate 26, fig. 3); *phulpatra*, from its resemblance to a flower, *phul* (Plate 24, fig. 5); *manakarnika*, a small brass cup; *kamandalu*, so called from its resemblance to a lotus flower, used by *sanyasis* (ascetics) (Plate 25, fig. 3); *pharsi-tambia*, so named from being used by Pársis (Plate 26, fig. 9), are all used for drinking water. *Gadava*, *tambia*, and *valyacha-tambia* are copper or brass pots, used for holding each person's supply of water; a *gadava* with a spout is called a *jhari* (Plates 24, fig. 11; 23, figs. 9, 14). *Vati*, a round brass cup used for taking milk, *ghee*, or curry at meals (Plate 24, figs. 12 and 13). *Pavsheri* (Plate 23, fig. 10*a*), *gundi* (Plate 23, fig. 11), *tapeli* (Plate 23, fig. 12), and *kasandi* (Plate 23, fig. 13) are used for carrying milk, and are usually piled one upon the other, and carried on the head; the *pavsheri* (quarter seer) on the top, placed with its mouth downwards, is the measure. *Ghangala*, a copper pot used for holding hot water for bathing, and also

for washing clothes in (Plate 24, fig. 6). *Telachi-jhari*, a small brass cup, with lid, for holding oil for daily use (Plate 25, fig. 2*a*). *Chahádani* or *kitli*, the English kettle, for making tea, is much used by educated natives; the tea leaves are put into the kettle and boiled (Plate 25, fig. 9).

(*c*) For the toilet: *Karanda*, a box for keeping red powder called *kunku*, which is applied by native women—both married and unmarried, not widows—to their foreheads; it has two compartments: in the lower is placed the red powder made by mixing turmeric *(halad)*, carbonate of soda *(pápadkhár)*, and lemon juice, in certain proportions; and in the upper is fixed a mirror to the lower lid, and a small box to the upper lid for keeping bees'-wax, with which the red powder is made to adhere to the forehead. *Dabi*, an air-tight box in which perfumed paste *(argajás)* is kept. When required, a small quantity is taken out with the index finger and applied to the back of the hand; it is also used for keeping red lead which is applied to the parting of the hair, and for *kajal* (lamp black mixed with oil) which is applied to the lower eyelashes of women; also for keeping *argajá*, or turmeric powder, which is put between the two eyebrows (Plate 27, fig. 13). *Kairi*, a brass mango-shaped phial, used for keeping *dátavan* (tooth powder) which is applied to the teeth for strengthening them; it blackens the teeth; it is now generally used by low caste women, especially after childbirth. *Arshi*, a flat brass box—round, square or oval—with a mirror in the lid.

(*d*) For carrying and serving betel-nut, or *pan-supári*: *Chauphula*, a box used for keeping cardamoms, cloves, mace, nutmeg, catechu pills, and other ingredients—in all thirteen—of *pan-supari* (Plate 27, fig. 1). It is composed of five, seven, or nine cup-shaped compartments, although the word *chauphula*, which means "four flowers," implies that it has four, which is not the case, as it is always made up of uneven numbers; each cup has a separate lid, shaped like the petal of a flower, with a small bird on the top, and is attached to the cup by a hinge; all the lids close upwards and inwards, and are kept closed by a screw handle formed like a lotus flower. *Chunál*, a box for keeping the slaked lime, which is applied to the leaf of the Piper betel (*nag-vel*, snake-creeper), and chewed with betel nut *(supari)* and other ingredients mentioned above (Plate 27, figs 5 and 6). *Adkittá*, a steel blade let into a brass frame, and worked like a nut-cracker; used for slicing betel nut (Plate 27, figs. 2 and 4); some are very ornamental, and, in addition to the surface decoration, have a quantity of small silver balls attached to small holes in the brass frame (Plate 27, fig. 4). *Pánpud* (*pán*—leaf, *pud*—drawer, a drawer for keeping leaves), used for keeping the leaves of the *nag-vel*; it also has a small compartment at one end for keeping the lime used with the leaf (Plate 27, fig. 7). *Tambakhuchi-dabi*, a small box for keeping tobacco, which is chewed with the *pan-supari*, and acts as a stimulant; it has two lids, each with two holes—the inner lid being a fixture, and the upper one working on its axis—so that when it is turned either to the right or left, the box is open or closed, as the case may be (Plate 27, fig. 12). *Dabi*, a small box used for keeping lime as well as catechu pills (Plate 27, fig. 13). *Panachá daba* (a box for leaves) is a brass box of modern invention, used for keeping together in one place *pan-supari* and all the ingredients that are used with it; the box usually has a small looking glass inserted in the lid; it is presented with other articles, such as dress, bedding, &c., to the bridegroom by the father of the bride after marriage (Plate 27, fig. 9). Another common form for the same purpose is the *mór* (peacock, Plate 27, fig. 14*a*), with a small box of several compartments (Plate 27, fig. 14*b*), which is fitted into the back. *Khal-batta* (mortar and pestle), used for pounding *pan-supari*, when required, for the aged who have lost their teeth (Plate 27, figs. 11*a* and 11*b*). *Pikdani*, a spittoon (Plate 27, fig. 10); *tasta*, a spittoon, also used for washing the hands and feet (Plate 27, fig. 15). *Attardani*, a small article for keeping *attar* (perfumed oil), a few drops of which are placed on the back of the hand, by means of a small silver spoon, after the distribution of *pan-supari* (Plate 27, fig. 3). *Gulab-dani* (rose-water holder), used for sprinkling rose-water over the guests at the conclusion of parties and other ceremonies (Plate 27, fig. 8).

(e) For religious purposes: *Tabak*, a brass plate used for carrying flowers and the small vessels required for the purpose of worship (Plate 28, fig. 1). *Ghanta*, a brass bell with a handle composed of Garud (a bird, the vehicle of Vishnu) and Máruti (the monkey god, the vehicle of Rám); the bell is rung at the beginning of worship as a warning to demons to depart and gods to appear (Plate 28, fig. 2). *Tamhan*, a small round dish of copper or brass, used for washing images at the time of worship; it is also used for pouring water at the time of performing *sandhyá* (prayer), and also for offering water oblations to gods, *rishis* and ancestors (Plate 28, fig. 3). *Arghya*, a small cup with a handle and elongated spout, from which sacrificial water is poured (Plate 28, fig. 4). *Adni*, a small tortoise-shaped stand on which the *shankh* (conch) is placed (Plate 28, fig. 5). *Loti*, a small brass pot used for drinking and carrying water (Plate 28, fig. 6). *Jhari*, a small pot with a spout, used for offering daily oblations of water to deceased relatives, and also used for taking a small quantity of water called *achman* at the time of performing *sandhyá* (prayer) (Plate 28, fig. 7). *Kachole*, a vessel with three or five oval divisions for holding the white and red sandalwood paste and the moistened rice, with which the brows of the gods are

marked (Plate 28, fig. 8). *Samai*, a small lamp placed on either side of the idol at the time of worship, in which clarified butter *(ghee)* is burnt (Plate 28, fig. 9, and Plate 29, figs. 5 and 15). *Abhishekapátra* is a small brass cup with a tapering base, like a top, with a small hole at the extremity, through which the water trickles on to the idol below; it is supported in a small stand, and is used for daily worship at home (Plate 28, fig. 10); a larger kind used in temples is suspended by a chain (Plate 29, fig. 13). *Sandhechi pali*, the spoon used for taking water during the performance of *sandhyá* (prayer) and other religious rites (Plate 28, fig. 11). *Halakárti*, a fish-shaped spoon for burning camphor before the idol (Plate 28, fig. 12). *Niranjan*, used for burning clarified butter *(ghee)* before idols (Plate 28, fig. 13). *Chauki*, a four-legged stand used for placing the idols upon (Plate 28, fig. 14). *Udabattiche ghar*, a stand for holding the perfumed incense sticks (*udabatti*), which are kept burning at the time of worship before the idol (Plates 28, fig. 15; and 29, fig. 10). *Panchpálé*, a box with five (*panch*) compartments (*pálé*) for keeping turmeric powder, *gulal*, *abir*, and *kunku*—powders for applying to the foreheads of the idols at the time of worship (Plate 28, fig. 16). *Pancharti*, a five-wicked lamp, for burning clarified butter (*ghee*) before the gods (Plate 28, fig. 17). *Dhuparti*, a stand for burning incense (*dhup*) (Plate 28, fig. 18). *Sampusht*, a box in two pieces, for keeping the idols at night after evening worship, and also for carrying them when travelling (Plate 28, fig. 19). *Naivedyacha pela*, a cup (*pela*) for offering sugar or milk (*naivedya*) to the gods at the end of worship (Plate 28, fig. 20). *Tulsi-vrindavan*, a small stand in which the *tulsi* plant (*ocymum sanctum*), the wife of Vishnu, is grown, the plant being worshipped daily by the female members of the family (Plate 28, fig. 21). *Kamal*, a stand for idols, named from its resemblance to an open lotus flower (*kamal*) (Plate 28, fig. 22).

Jina or Tirthankara, one of the saints of the Jainas (Plate 29, fig. 1). Maruti or Hanuman, the monkey-god, son of Vayu (wind) was the devoted ally of Ráma, in his conflict with the Rakshasas; he has the reputation of possessing extraordinary physical powers, and consequently he is recognised as the god of power; he is universally worshipped by village communities, and a temple is invariably erected to him on the outskirts of every village in Maharashtra (Plate 29, fig. 2). *Udbattiche-jhad*, a tree-shaped brass stand mounted on an elephant, used for burning incense sticks; it is generally placed near the plate of the bridegroom or other distinguished guests at dinner-time (Plate 29, fig. 3). *Murlidhar*, a figure of Krishna playing on the flute (Plate 29, fig. 4). *Bálkrishna* (a baby Krishna), the eighth incarnation of Vishnu, crawling like a child, with a ball of butter in one hand, typical of his having been born in a family of milkmen (*gavalis*) (Plate 29, fig. 6). Rám, the deified king of Oudh, believed to be the seventh incarnation of Vishnu, with his wife Sita (Plate 29, fig. 7). *Ashtabhuja-devi*, an eight-handed goddess, slaying the giant Mahisasura, who had concealed himself in the body of a buffalo (Plate 29, fig. 8). Vishnu, seated on the coils of a cobra (Plate 29, fig. 9). Vishnu, the preserver, the second member of the Trimurti (Plate 29, fig. 11). Mahadeo, represented by the *linga*, with his vehicle *Nandi* (the bull) before it, the whole mounted on a brass stand (Plate 29, fig. 12). Bhavani or Kali, the consort of Shiva (Plate 29, fig. 14). Rája Bali, a fabulous king of Pátál, who was proverbially pious and liberal. On the *pratipada* day in the Diválé, Rája Bali is worshipped by all Hindus, who on that day have their houses thoroughly swept and dusted before sunrise, and the sweepings placed in an old basket, which is given to the servant to take and place, with a lamp and a pice or two, on the road-side, the servant beating a *batáki* and reciting:—"*Ida pida jao, áni Baliche ráj yeo*" ["Let all calamities disappear and Bali's Ráj be established again."]. Bali is then worshipped, and a *köt* or heap of crackers and other fireworks, arranged like a fort and fired, end the ceremony. Rája Bali is supposed to have lived before Parashurám or Rám. Váman, the fifth incarnation of Vishnu, drove him to Pátál, or an imaginary place below the earth, the kingdom of that region being eternally assigned to him (Plate 29, fig. 16). Parvatí, the wife of Shiva (Plate 29, fig. 17). Ganpati, the god of knowledge and the son of Shiva and Durga, is a fat four-handed seated figure, with the head of an elephant; before the commencement of all auspicious ceremonies this deity is first worshipped, as he is supposed to be the destroyer of all difficulties (Plate 29, fig. 18). *Gauri* is the head of a woman in brass, which is put on the figure of a woman made of cloth and dressed like a high-caste woman of the Deccan, and is worshipped in every house in the Deccan in August or September during the Ganpati festival (Plate 29, fig. 19). *Ganga jali* is the vessel in which the sacred water of the Ganges (after which it is named) is kept and worshipped along with the household gods. The small head of a woman forming the stopper is symbolical of the Ganges (Plate 29, fig. 20).

Bells play a very important part in Hindu worship. They may be seen hanging in clusters at the entrance of every temple, and usually they are objects of votive offerings. Plate 41 gives a good idea of the bells which are at the entrance of Kashi-vishweshwar in Buleshwar, Bombay.

(f) For lighting: The use of kerosine oil has, in a great measure, superseded cocoa-nut oil, so that the brass lamps for burning the latter are now not so much in demand. The following are the principal lamps

used for burning cocoa-nut oil:—The *kandil*, a hanging lamp, generally used in shops (Plate 38, figs. 1, 2, and 3); the *samai*, a standard lamp used in houses (Plate 38, figs. 4 and 5); the *divli*, a small hanging lamp used for carrying about the house (Plate 38, fig. 6); the *lamandiva*, a hanging lamp used in the kitchen (Plate 38, fig. 7).

Brass Chains.—One of the most common forms of enjoyment indulged in by both rich and poor of the native community is that of swinging in a cot, and this, to those who can afford to do it, is developed to a fine art. The chains, which are attached to the four corners of the cot and suspended from the ceiling, are objects of art, upon which the highest skill in design and metal working is bestowed. Bhavnagar and Sihor (about fifteen miles from Bhavnagar) have the reputation for making these chains. They are cast from patterns first carved in wood, further finished by filing, and incised lines of ornament hammered in with an iron punch. One of each of three sets (four form a complete set) is illustrated in Plate 40. The large perforated bowl-shaped receptacle is an incense-burner; and the smaller perforated bowls contain small brass balls which, when set in motion, give a jingling noise, so dear to the native ear, as the cot is swung to and fro. The individual rocked in one of these jingling cots, smoking his *hûka* in an atmosphere redolent with incense, enjoys the very essence of luxurious and slumberous ease.

All articles, excepting those which are ornamented, are sold by weight, at so much a *seer*, the prices varying according to the market rate of copper and brass sheets. The *seer* in the city of Bombay is equal to $\frac{3}{4}$ lb., whereas in the Mofussil it is equal to 2 lbs.

LIST OF ILLUSTRATIONS.

The Brass and Copper Wares of the Bombay Presidency. Plates 23 to 26.—Articles used for domestic purposes. 27.—Articles used for *pan-supâri*. 28, 29.—Articles used for religious purposes. 30, 31.—A copper-smith at work. 32.—Tools used for working in brass and copper. 33.—A native lathe. 34.—Large Vase, in *repoussé*. 35.—Specimens of ornamental work executed at the Reay Art Workshops. 36.—Brass plates from Poona and Kutch. 37.—Entrance door to the Shrawak Temple. 38.—Lamps. 39.—Sham jewellery made in brass at Poona. 40.—Ornamental chains. 41.—Bells at the entrance to Kashi-vishweshwar Temple.

SIR J. J. SCHOOL OF ART, BOMBAY.

23.—THE BRASS AND COPPER WARES OF THE BOMBAY PRESIDENCY.
Articles used for domestic purposes.

M. V. DHURANDHAR.

24.—THE BRASS AND COPPER WARES OF THE BOMBAY PRESIDENCY.

Articles used for domestic purposes.

SIR J. J. SCHOOL OF ART, BOMBAY.

M. V. DHURANDHAR.

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SIR J. J. SCHOOL OF ART, BOMBAY.

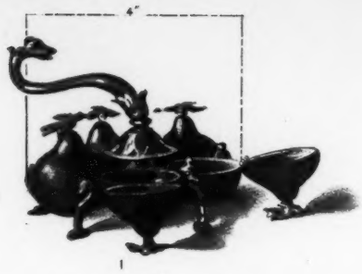
25.—THE BRASS AND COPPER WARES OF THE BOMBAY PRESIDENCY.
Articles used for domestic purposes.

M. V. DHURANDHAR.

SIR J. J. SCHOOL OF ART, BOMBAY.

26.—The Brass and Copper Wares of the Bombay Presidency.
Articles used for domestic purposes.

M. V. DHURANDHAR.



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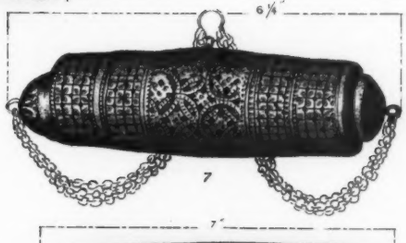

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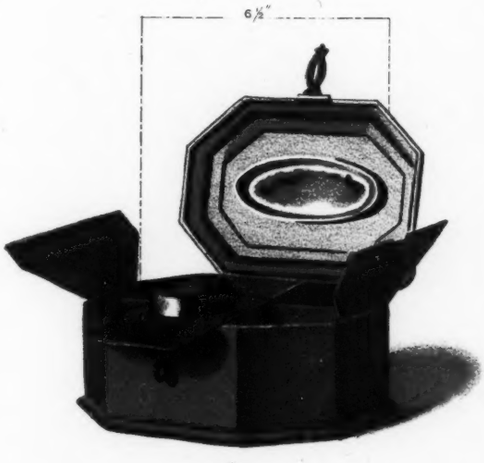

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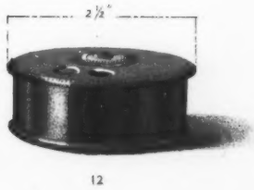

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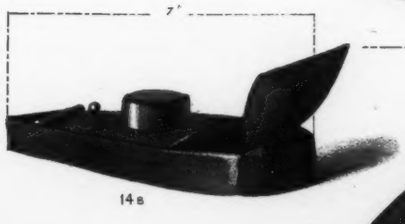

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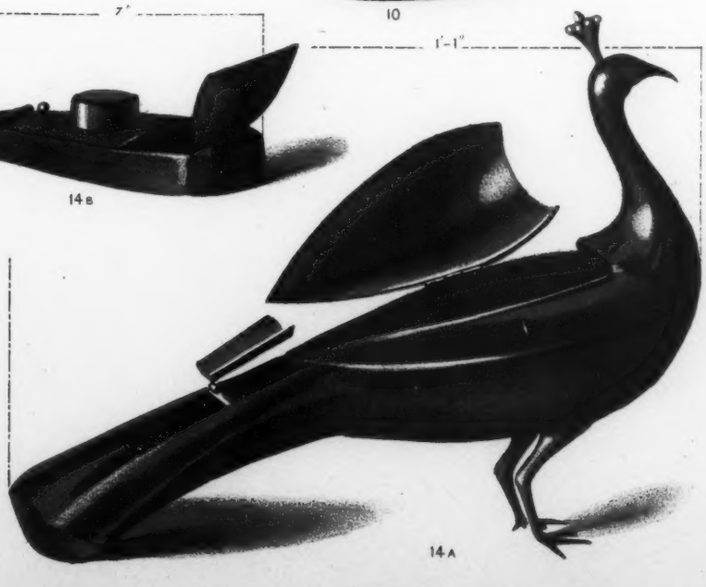

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SIR J. J. SCHOOL OF ART, BOMBAY.

27.—THE BRASS AND COPPER WARES OF THE BOMBAY PRESIDENCY.
Articles used for *pan-supári*.

M. V. DHURANDHAR.

28.—THE BRASS AND COPPER WARES OF THE BOMBAY PRESIDENCY.

Articles used for religious purposes.

SIR J. J. SCHOOL OF ART, BOMBAY.

M. V. DHURANDHAR.

29.—The Brass and Copper Wares of the Bombay Presidency.
Articles used for religious purposes.

SIR J. J. SCHOOL OF ART, BOMBAY.

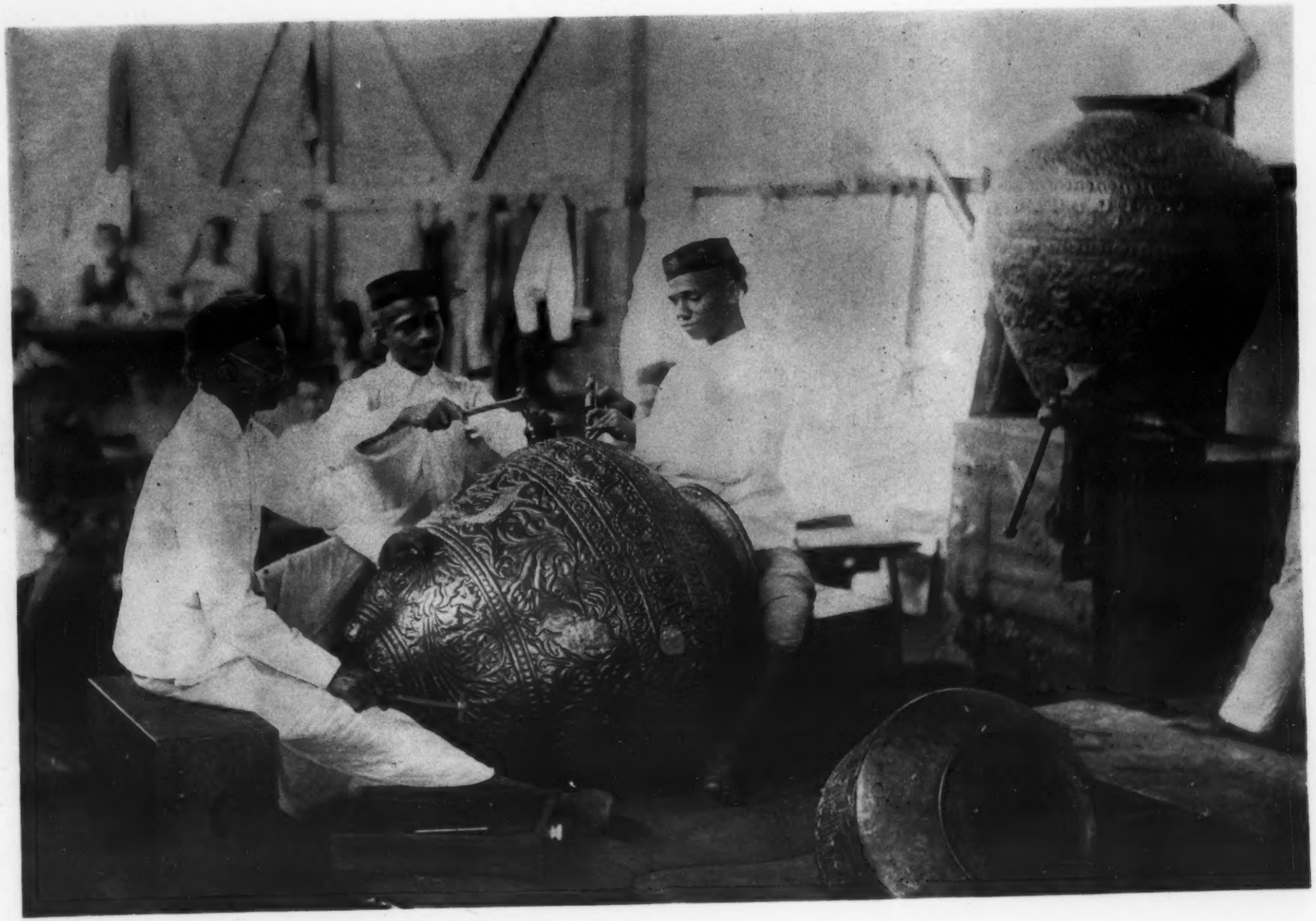
M. V. DHURANDHAR

30.—THE BRASS AND COPPER WARES OF THE BOMBAY PRESIDENCY.
A copper-smith at work.

31.—THE BRASS AND COPPER WARES OF THE BOMBAY PRESIDENCY.
A copper-smith at work.

32.—The Brass and Copper Wares of the Bombay Presidency.
Tools used for working in brass and copper.

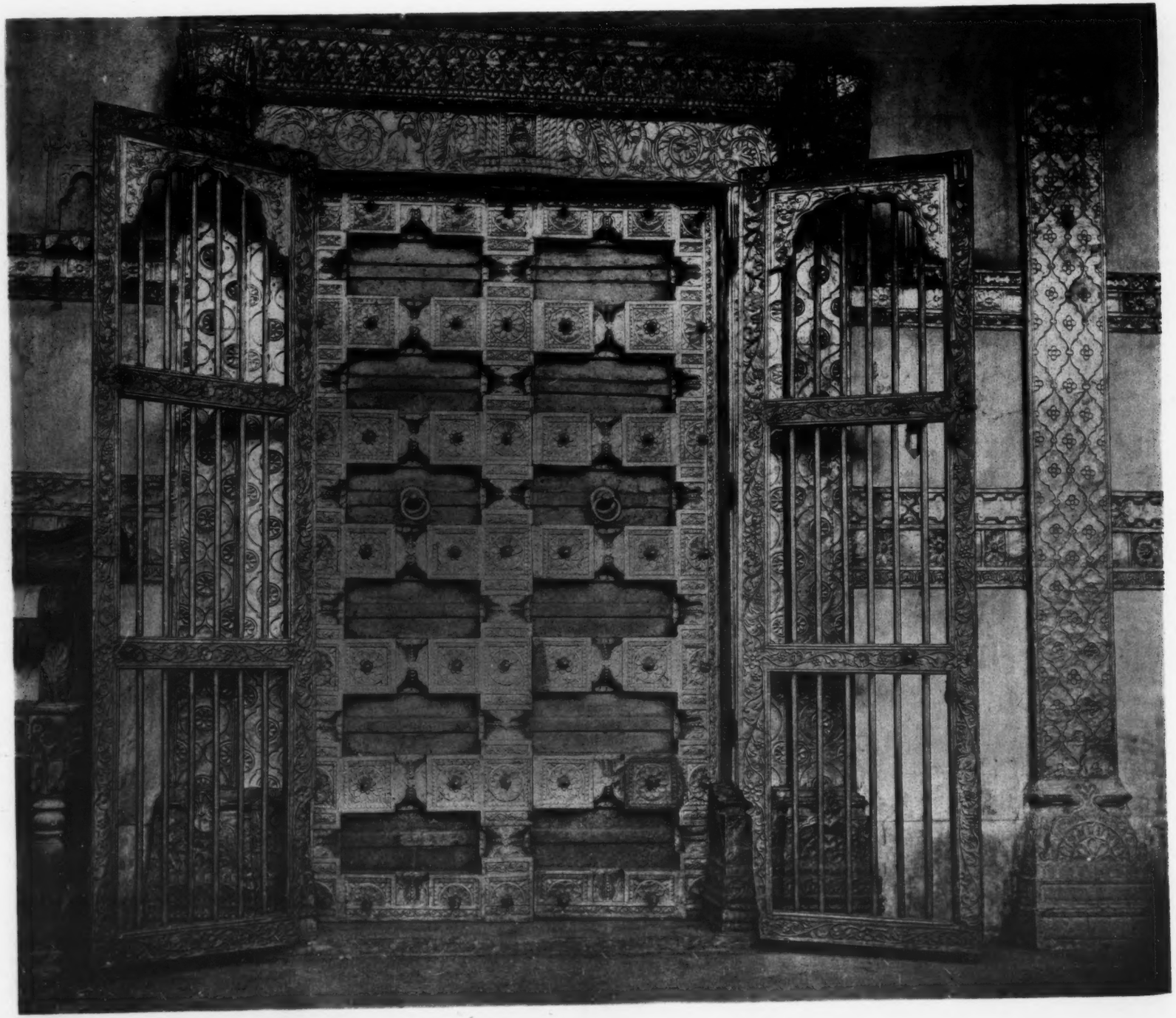
33.—The Brass and Copper Wares of the Bombay Presidency.
A native lathe.



34.—THE BRASS AND COPPER WARES OF THE BOMBAY PRESIDENCY.
Large Vase, in *repoussé*. Reay Art Workshops.

35.—The Brass and Copper Wares of the Bombay Presidency.
Specimens of ornamental work executed at the Reay Art Workshops.

36.—The Brass and Copper Wares of the Bombay Presidency.
Brass Plates from Poona and Kutch.

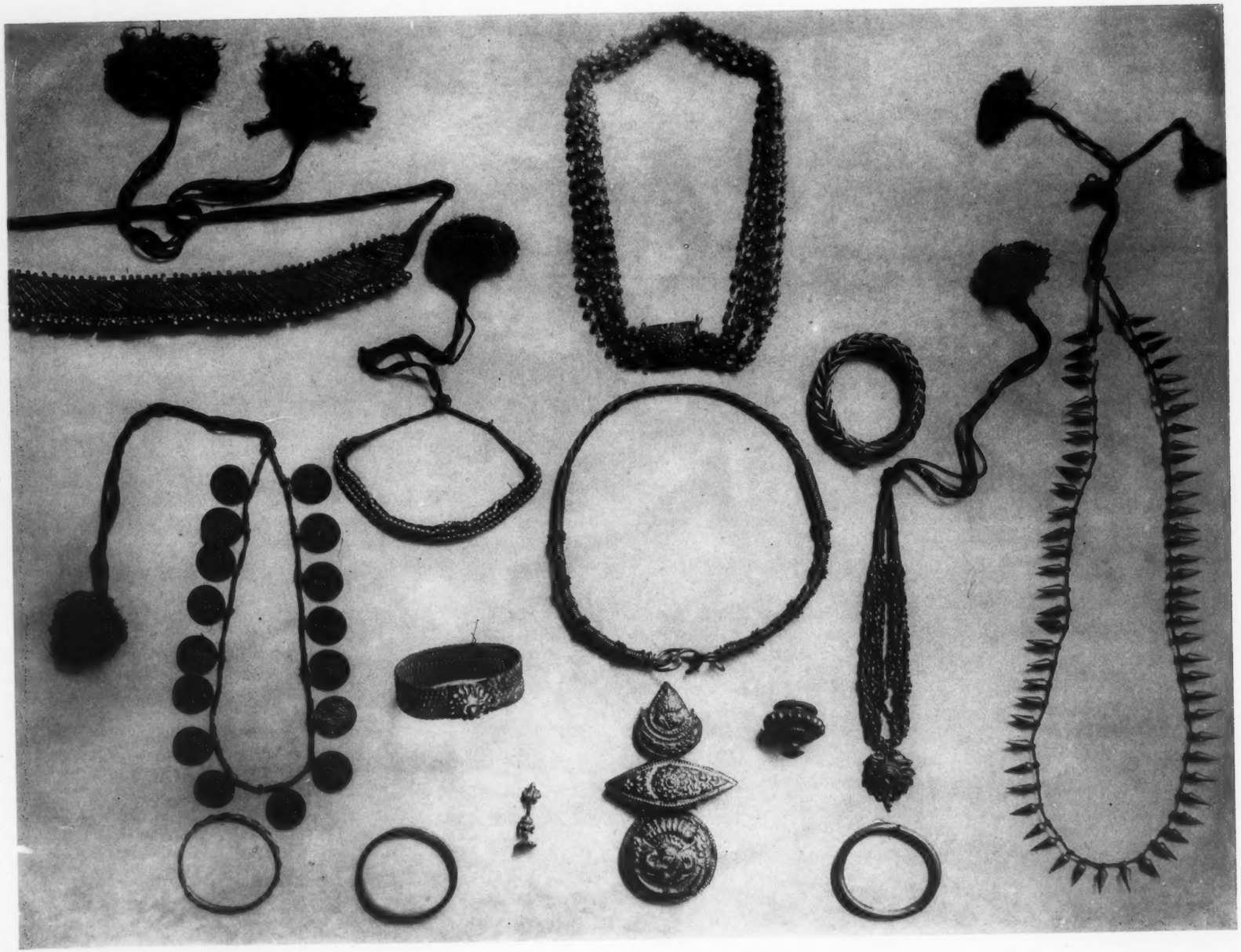


37.—The Brass and Copper Wares of the Bombay Presidency.

The entrance door to the Shrawak Temple, Pydhoni, Bombay.

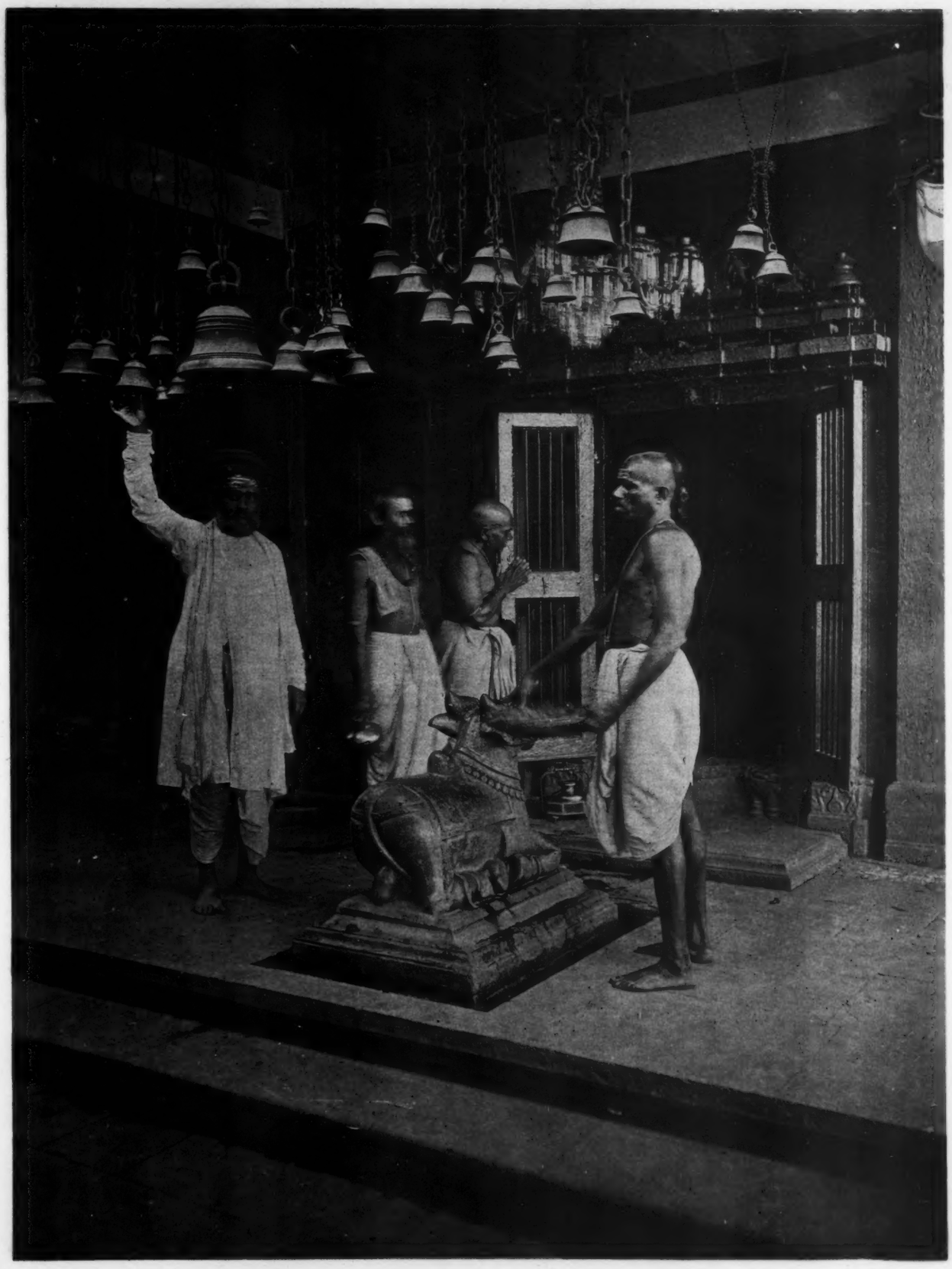
38.—The Brass and Copper Wares of the Bombay Presidency.

Lamps.



39.—The Brass and Copper Wares of the Bombay Presidency.
Sham jewellery made in brass at Poona.

40.—THE BRASS AND COPPER WARES OF THE BOMBAY PRESIDENCY.
Ornamental chains.



41.—The Brass and Copper Wares of the Bombay Presidency.
Bells at the entrance to Kashi-vishweshwar Temple, Buleshwar, Bombay.

The Journal of Indian Art and Industry.

LETTER FROM KING JAMES I. OF ENGLAND TO THE SHAH ABBAS OF PERSIA, DATED 14th FEBRUARY, 1622.

The first attempt made by the East India Company to open a trade with Persia dates from 1614, when the Agency at Surat sent Messrs. Steele and Crowther into that country to examine the practicability of the speculation, and what harbours were fit for shipping. Mr. Steele, having described Jask, situated about 90 miles from Ormuz, as a convenient port at which trade might be commenced, he was directed to proceed through Persia, by Aleppo, to England, and was strongly recommended, for his ability and knowledge, to the Court of Directors. A firman having been obtained from the King of Persia for permission to trade at Jask, an expedition was sent thither, towards the end of 1616, under the command of Edward Connok. Thence Connock proceeded to Ispahan, and writing to the Court of Directors under date the 19th January, 1617, he pointed out that Jask was a fit place for a fortification, "which," he added, "I doubt not but from the Sophy to obtain." On the 4th August following he wrote, describing an interview with the King of Persia, on which occasion His Majesty called for wine, and in a large bowl drank His Majesty's (of England) health upon his knee, saying that Connok was welcome, that the King of England should be his elder brother, that "his friendship he did dearly esteem and tender, that he would grant us Jask or any other port we would require, and such freedom in every respect as in his honour he might grant, and all this in the Spanish Agent's presence, to whom he hath neither offered good word nor countenance from that to this hour, but hath graced me with four several presents."

News of this interview quickly reached Goa, accompanied by the additional information that the English contemplated the erection of a fort at Jask. Orders were also shortly afterwards received from Portugal that the English were to be, by all possible means, prevented from trading with Persia, and, in order the better to enforce these instructions, Ruy Frere de Andrade was sent to cruise in the Persian Gulf with a fleet of five galleons.

Mr. Connok was succeeded as Agent at Ispahan by Mr. Barker, and the latter, in 1618, obtained three firmans in favour of the English, and these were followed by a treaty which gave them considerable facilities for trade in Persia. In the following year the agents at Ispahan delivered to the Shah a letter from King James, but of this letter no copy is now extant.

The Portuguese, however, persistently offered every possible obstruction to the English trade in Persia, and, on the arrival, in November 1620, of two of the East India Company's ships (the "Hart" and the "Eagle") at Jask, they found the port blockaded by Ruy Frere's fleet, which being superior in force they were obliged to return to Surat. Here they were joined by the "London" and the "Roebuck"; the combined fleet then returned to Jask, where an indecisive action took place on the 17th December. The Portuguese, however, gave way and allowed the English to enter the port, and then retreated to Ormuz to refit. Shortly afterwards, however, they returned to Jask Roads to renew the action, and another engagement took place on the 28th December, when Ruy Frere's fleet was defeated. During the second engagement Captain Andrew Shilling, who commanded the English fleet, was struck by a shot in the shoulder, from the effects of which he died on the 6th January, 1621.

The Directors of the East India Company had, on several occasions, seriously considered the best means for overcoming the opposition of the Portuguese to their trade in Persia, and at a meeting on the 23rd January, 1622, they decided that letters should be prepared for Persia, "and one procured from the King to the King of Persia that the Company may have better privileges than formerly and more security." The letter, of which a facsimile accompanies, is the one thus procured by the Company. It was duly delivered to His Majesty, who, in reply, sent back two letters to King James, which arrived in England in August, 1624, and were delivered by the Deputy-Chairman and others to the King at Woodstock. I have made enquiries in all likely quarters, but have been unable to ascertain the present existence of either of these letters.

After the engagement with the Portuguese off Jask, the Khan of Shiras threw considerable obstacles in the way of the English carrying on trade in Persia; but this was with the sole object of forcing them into a joint action with the Persians for the expulsion of the Portuguese from the country. To this the English eventually acceded, and ere King James' letter had arrived in Persia, Ormuz had fallen before the combined forces of the English and Persians.

By some means or other this letter of King James to the Shah Abbas found its way into a private collection in Holland, and it was purchased, together with a number of miscellaneous articles, and presented by the purchasers to the Royal Antiquarian Society of Amsterdam. It was deposited for safety in the Royal Museum in that city, where it was pointed out to me by the Director when I visited that Institution in 1893. Upon its being represented to Mr. P. van Eeghen, the distinguished President of the Royal Antiquarian Society, that this letter had no reference, either directly or indirectly, to the Dutch trade in the East, but that it was an excessively interesting document in connection with the proceedings of the late English East India Company, he, with the unanimous assent of his colleagues on the Council of that Society, in the most handsome manner, presented King James' letter to the Secretary of State for India, and it has now found an appropriate resting place in the Archives at the India Office.

Oct., 1896. F. C. DANVERS.

A TRADITION OF RAPHAEL IN PERSIA.

The histories of many of the various styles of Oriental Art have still to be written, and it is probable that long before any scientific attempt has been made to classify the different branches of the Mohammedan or Saracenic style, another, the most distant and, within a few years of our time, the most hopeless to expect any history of—will be as well known, and its artists' names as familiar as those of our European artists of the last three centuries. This Art is that of the Japanese, which has fortunately found favour whilst the traditions of the great artists are still the every-day talk of their successors.

The Saracenic styles are more varied, having been engrafted upon the national arts of many diverse nations and submitted to influences, which, in many cases, have so changed their ornamentation that they have almost ceased to be recognizable as examples of the pure style shown in the monuments of Cairo.

The most casual observer of Oriental manuscripts cannot have failed to have noticed that, like the change from the Gothic black letter to the Italian forms, the writing of the Arabs and Persians at a somewhat earlier date changed from Cufic, with its stiff upright letters and sharp angles, to the flowing Naskhi, which has been generally adopted throughout the Moslem world, although certain and, perhaps, more barbarous branches of the Mohammedan Tartars in Mongolia and the Arabs of Morocco prefer the early stiff characters in the same manner that some of the Northern nations of Europe still cling to the black letter. A corresponding development in drawing and painting can similarly be traced in European and Saracenic Art. In Europe there was a gradual passage from the flat conventional work of the Byzantine artists, the final change from conventionality to naturalism being attributed to the period of Raphael, but in the East the flat conventional treatment of the Byzantine and Sassanian Empires was succeeded by an equally conventional treatment, which shows Chinese features so strongly marked that it seems to point to an early School located somewhere in Tartary, from whence artists were sent to the Courts of Persia, Turkey, Syria and Egypt. The peculiar work of these artists, in Persia, is known as "Sefaveean," as it is found in its perfection in the monuments, books, manuscripts and woven stuffs which remain to us from the period which terminated with Shah Abbas, the seventh ruler of the Sefaveean dynasty. Then suddenly came the change which so utterly destroyed the spirit of Tartar-Persian Art that no amount of dexterous workmanship could compensate for the violation of principles which had guided the artist through very many generations. This change, from conventionalism to naturalism, can be observed at that time in all the work from the Saracenic countries; but in Persia alone, as far as I am aware, the record of the change is preserved; and to us it is of great interest. Our term "pre-Raphaelite"—applied to works produced before the period of Raphael—can also be used in Persia to distinguish works previous to those of the new departure due to foreign influence. The artists of Ispahan, and of Teheran the more modern capital, are still proud of their descent from certain young painters who were sent by Shah Abbas to study in Rome, and who brought back with them the new ideas which were truly "new wine in old bottles."

Judging by the still numerous evidences of their work, these Persian artists were mere copyists and never attempted to master the principles guiding European Art. They were content to bring back with them careful copies of a few groups of the Holy Family, which at the same time were typical illustrations of the foreign School and also represented the Holy Mother and Child, Miriam and Issa, two popular saints amongst the Shiah Moslems of Persia.

Towards the end of the 17th century, especially in Persian and Indian decorative paintings, can the new departure be seen; and, when the work of a first-class artist, mural paintings rise almost to the level of the art of Giotto, the utmost that the Oriental seems able to attain, even when studying in later and more developed Schools. It is evident, though, that they intended to attain a European standard from the constant use of the name of Raphael, to "paint like Raphael" being a term of praise which Persian artists valued highly.

Of the earlier and pre-Raphaelite style four examples are given in this number, one reproduced from a beautiful drawing, the property of Mr. Charles Read, of the British Museum; and the originals of the other three, a most interesting set of portraits—said to be of Robert and Anthony Shirley, envoys to the Court of Shah Abbas, and of Miriam, the Armenian princess who afterwards became Lady Shirley—are in the collection of Mr. Alfred Morrison, who possesses some of the rarest examples of Saracenic Art. Little description is needed of these drawings. Mongol influence is visible throughout in each of them; the people are distinctly moon-faced, and the Prince, in Mr. Read's drawing, is regarding a hawk, of which a Chinese or even a Japanese artist might be proud.

The three drawings of Mr. Morrison's were placed on fresh Oriental mounts some time in the last century, and bear on their backs inscriptions and stamps of various owners, with details of the sums for which they were purchased; and, what is most valuable, one of the set bears an inscription stating that it was the work of Tarubi Beg and produced in the Library of Kultas Khan, both names being Turkistani and not Persian, although the work was evidently done in Ispahan at the time, or shortly after the time, when the English envoys were resident there.

A curious incident in each of the men's portraits is the accompanying dog, a characteristic touch of nature which would be equally appropriate three centuries later in a modern Oriental drawing of a British Sahib.

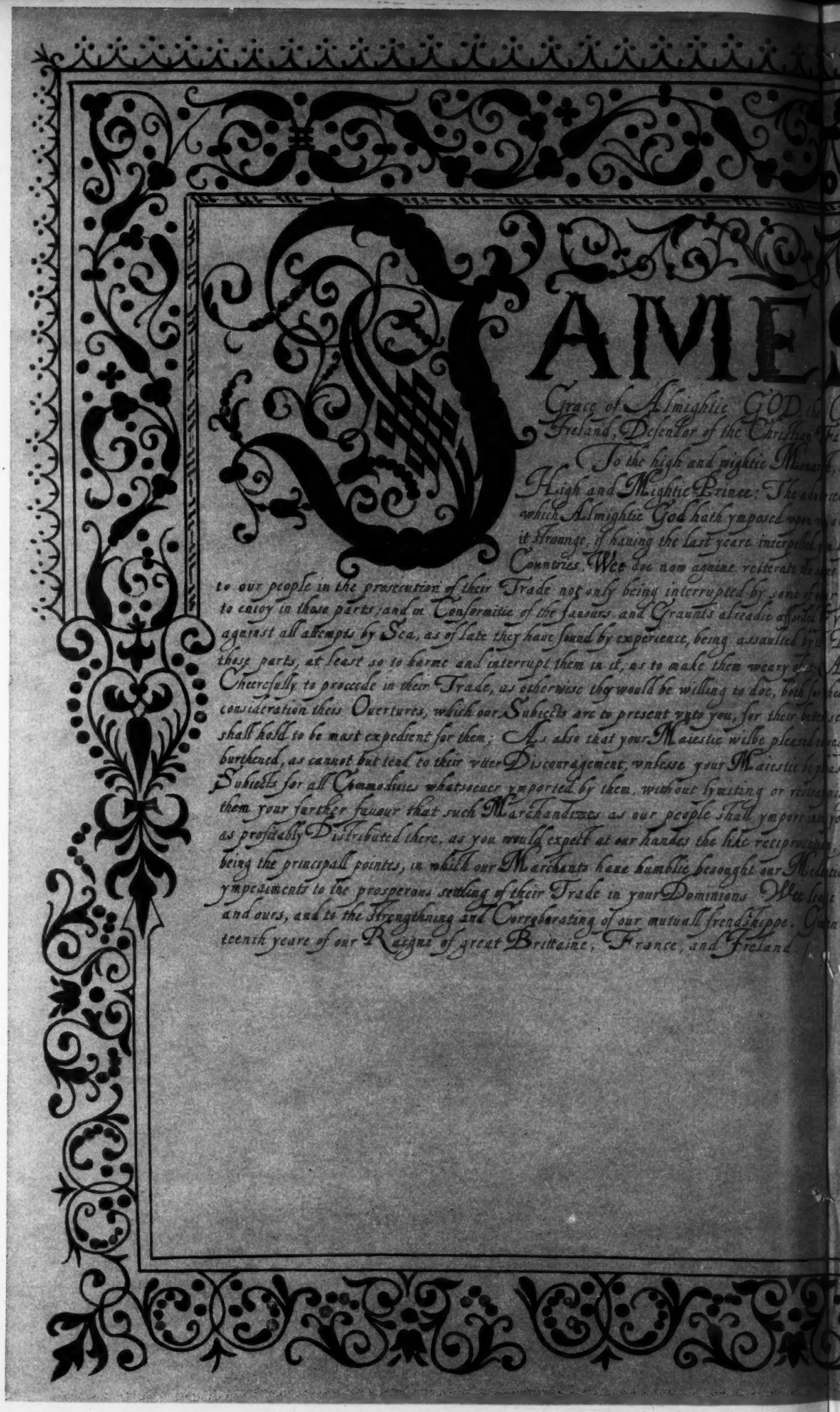
A few years since, Colonel Hanna exhibited in London his very valuable collection of old Tartar-Persian portraits, but unfortunately they did not remain long enough in London to allow of a systematic examination or a comparison with similar works which, although exceedingly rare, may possibly be found amongst the Oriental manuscripts in our National Libraries.

This slight account of an interesting phase of Saracenic Art may, it is to be hoped, induce some one with more leisure and opportunities than the writer to study the subject and, especially, to collect, as far as possible, the names of the artists, in order to throw more light upon the early connection between the Arts of Persia and China.

C. PURDON CLARKE.

LIST OF ILLUSTRATIONS.

42.—Letter from King James I. of England to the Shah Abbas of Persia. 43, 44.—Supposed portraits of the Shirley brothers. 45.—Supposed portrait of Miriam, an Armenian princess, afterwards Lady Shirley. 46.—A Prince and his hawk.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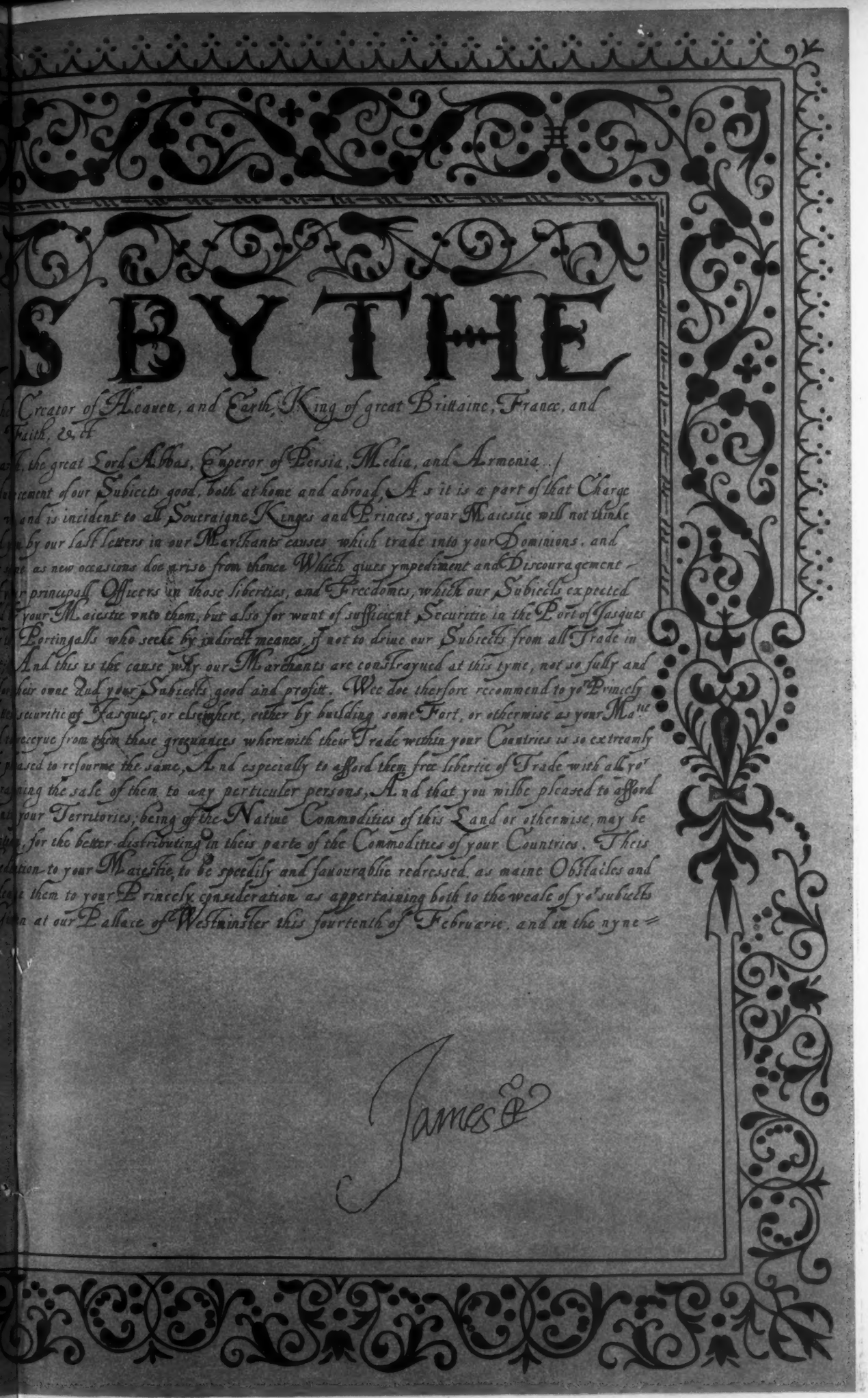
Grace of Almightie GOD
Freland, Defendor of the Christian
To the high and mightie Monar
High and Mightie Prince: The adv
which Almightie God hath ympaced upon
it Straunge, if having the last yeare interpelled
Countries. Wee doe now againe reiterate the
to our people in the prosecution of their Trade not only being interrupted by some of
to enioy in those parts; and in Conformitie of the fauours and Graunts alreadie afforded
against all attempts by Sea, as of late they haue found by experience, being assaulted by
those parts, at least so to harme and interrupt them in it, as to make them weary of
Cheerefully to proceede in their Trade, as otherwise they would be willing to doe, both for
consideration theis Ouertures, which our Subiects are to present vnto you, for their bette
shall hold to be most expedient for them; As also that your Maiestie wilbe pleased
burthened, as cannot but tend to their vtter Discouragement, vnlesse your Maiestie be
Subiects for all Commodities whatsoeuer ymported by them, without lymiting or restra
them your further fauour that such Marchandizes as our people shall ymport
as profitably Distributed there, as you would expect at our handes the like reciprocall
being the principall pointes, in which our Marchants haue humblie besought our Mediat
ympediments to the prosperous settling of their Trade in your Dominions Wee
and ours, and to the Strengthning and Corroberating of our mutuall frendshippe.
teenth yeare of our Raigne of great Britteine, France, and Freland.

42.—LETTER FROM KING JAMES I. OF ENGLAND TO T



S BY THE

Creator of Heauen, and Earth, King of great Brittaine, France, and
Faith, &c.

, the great Lord Abbas, Emperor of Persia, Media, and Armenia.

ncement of our Subiects good, both at home and abroad. As it is a part of that Charge
and is incident to all Soueraigne Kinges and Princes, your Maiestie will not thinke
by our last letters in our Marchants causes which trade into your Dominions, and
e as new occasions doe arise from thence Which giues ympediment and Discouragement
r principall Officers in those liberties, and Freedomes, which our Subiects expected
your Maiestie vnto them, but also for want of sufficient Securitie in the Port of Jasques
Portingalls who seeke by indirect meanes, if not to driue our Subiects from all Trade in
And this is the cause why our Marchants are constrayned at this tyme, not so fully and
eir owne and your Subiects good and profitt. Wee doe therfore recommend to yor Princely
securitie at Jasques, or elsewhere, either by building some Fort, or otherwise as your Mate
receyue from them those greuances wherewith their Trade within your Countries is so extreamly
ased to resourme the same, And especially to afford them free libertie of Trade with all yor
ng the sale of them to any perticuler persons, And that you wilbe pleased to afford
your Territories, being of the Native Commodities of this Land or otherwise, may be
for the better distributing in theis parte of the Commodities of your Countries. Theis
ation to your Maiestie to be speedily and fauourablie redressed, as maine Obstacles and
e them to your Princely consideration as appertaining both to the weale of yor subiects
n at our Pallace of Westminster this fourteenth of Februarie, and in the nyne=

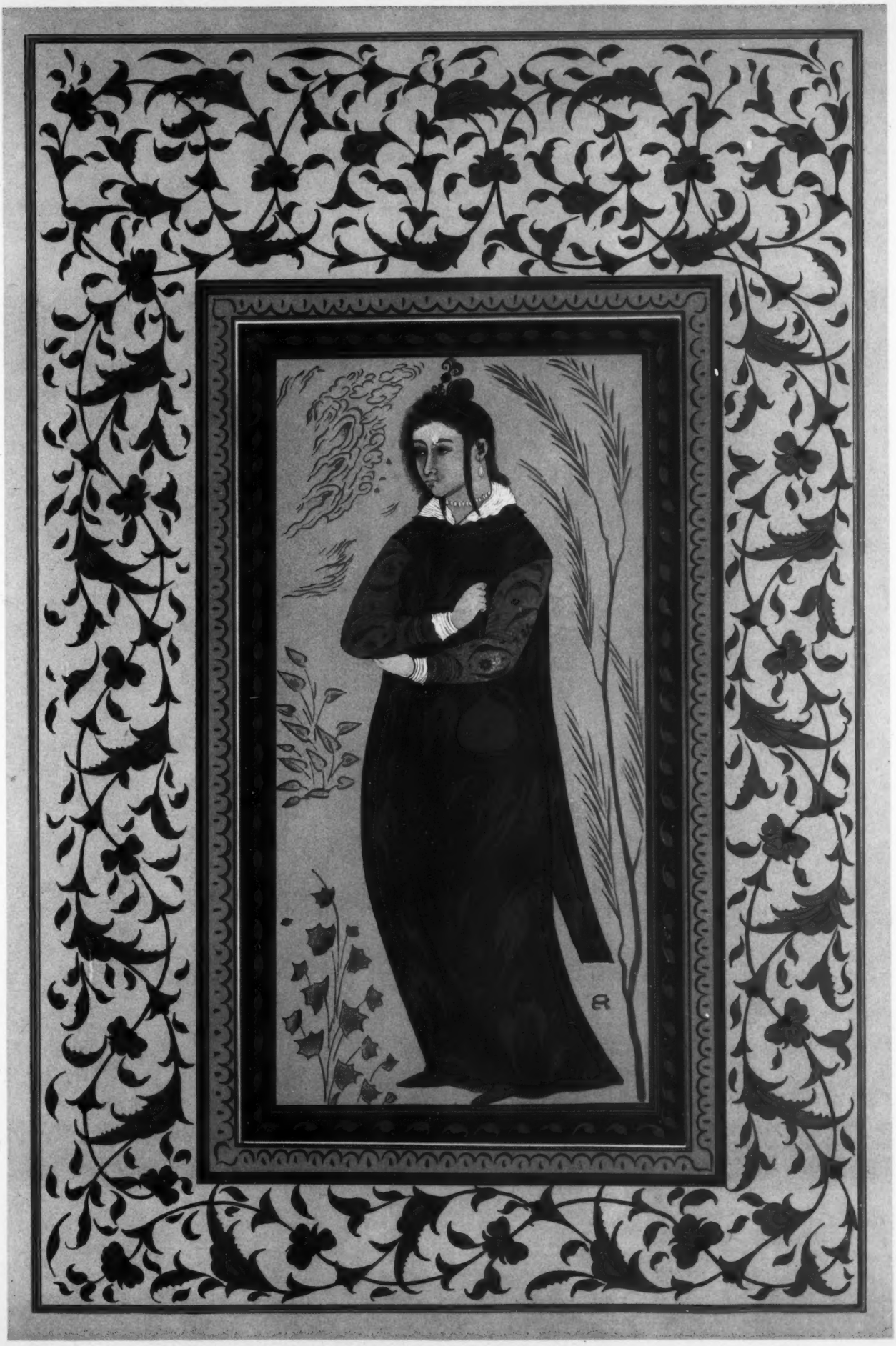
James R

TO THE SHAH ABBAS OF PERSIA, DATED 14TH FEBRUARY, 1622.

43.—PERSIAN DRAWING. Supposed portrait of one of the Shirley brothers, Envoys to the Court of Shah Abbas. Dated A.D. 1627. By Tarubi Beg, a Turkistani artist of the Court at Ispahan.

44.—PERSIAN DRAWING. Supposed portrait of one of the Shirley brothers, Envoys to the Court of Shah Abbas. Painted about the year 1627 A.D. by Tarubi Beg, a Turkistani artist of the Court at Ispahan.

In the collection of Alfred Morrison, Esq.



45.—PERSIAN DRAWING.

Supposed portrait of Miriam, an Armenian Princess, afterwards Lady Shirley.
Painted about the year 1627 A.D. by Tarubi Beg, a Turkistani artist of the Court at Ispahan.

From the collection of Alfred Morrison, Esq.

46.—PERSIAN DRAWING.

A Prince and his hawk. 16th century.

From the collection of Charles Read, Esq.

The Journal of Indian Art and Industry.

THE POTTERY AND GLASS INDUSTRIES OF THE NORTH-WEST PROVINCES AND OUDH.

FROM A MONOGRAPH BY MR. H. R. C. DOBBS, C.S.

CHAPTER I.

THE POTTERY TRADE, ITS HISTORY AND DIVISIONS.—Earthen vessels made on the wheel have been used in Hindustán without doubt ever since the Aryan invasion. The first known mention of them is in the Rig Védá, and by the traditions of these provinces their invention is attributed directly to the gods. One of these legends tells how Kopá Bhagat Rishi, the fabled progenitor of the potter caste, was ordered by Parméswar to make earthen vessels. The Rishi's primitive method involved the baking of the pots for a full year; but on one memorable day, the Sukat Chauth or birthday of Ganéshá, after he had filled his kiln, a cat gave birth to some kittens in one of the pots. Hereupon the saint prayed earnestly for the safety of the kittens, who were preserved by Parméswar's causing the vessels to be baked in the miraculously short time of one day. The residence of Kopá Bhagat is said to have been at Jagganáth, which is accordingly regarded by potters as their headquarters. Another account is that in old days people used to work up the clay for pots with their spittle, and Parméswar deeming this unclean revealed the secret of the wheel.

Whatever their origin may be, traditional ceremonies, superstitions and observances in which earthen vessels play a part are inwoven with the life of a modern Hindu from his birth to his death. In spite of this fact, the rules relating to them in the Hindu and Muhammadan scriptures are very few.

In the Smrití Sloka of Yajnavalkya we are told that an earthen pot once touched by food can be purified by being baked again in fire, but if touched by filth it can never be purified. The Matákshara asserts that an earthen vessel must be thrown away if touched by a Chándála, or man of like caste, while in one of the Shastrás the special privilege of using earthen vessels for three days without contamination is given to the inhabitants of the holy city Benares. In strong contrast to this dislike of earthen vessels on the part of the Hindus is the practice of the Muhammadans, who are enjoined in the Darrimuktar to use them rather than metal vessels, for the reason that the Prophet of God has said that "those who keep earthen vessels in their houses are visited with respect by angels."

The pottery trade of these provinces is divided into five branches, namely,—the manufacture of rude red pottery, of rude glazed pottery, of painted and unglazed coloured wares, of ornamental pottery painted and glazed, and of clay models.

CHAPTER II.

ARTICLES OF DOMESTIC USE.—The largest of these is the *mát*, *mathor* or big *matká*, the price of which ranges from three to eight annas. It is used for the storage of water. Smaller *matkás* are sold for one anna. The *gharra* or *gagarí*, sold usually for about three pies, is used for drawing water from wells and for carrying water. It differs considerably in different districts in the width of its mouth and the shape of its body. The *matkí* is a squat vessel with a wider mouth than the *gharra*, and is used for storing water. The *kúnr* or *kowára* is a vessel like the *gharra* with a longer neck, much used in Oudh for irrigation from wells. The *gudrua* is a picturesque vessel used for carrying and storing Ganges water. It has two ears, one on each side, pierced with holes so that it can be slung up by a rope. The average retail price of all these vessels is three pies. They are used for storing grain as well as for water. A *gharra* used for carrying water does not usually last more than three months, while if used for storing water or grain it may last for several years. The *surâhi jhajhar* or *kúza* is a long-necked jar of various shapes. Its selling price is two for three pies, and it lasts, if in constant use, for about a month. It is used especially in the hot weather for holding drinking water, chiefly by Musalmáns. It is nearly always ornamented with incised patterns or moulded designs, and is very commonly coloured. The *lutka* is a small vessel shaped almost like a cylinder, used for taking water out of a larger vessel. The *badhaná* is shaped like a small *gharra* with a spout in the side. It is used by Musalmáns for bathing and especially for their religious ablutions, and is consequently never used by Hindus. The *karua*, called in Almora and Garhwál *alúwa*, which exactly resembles the *badhaná*, except for the fact that it has only a hole where the *badhaná* has a spout, is used largely for carrying water, and is besides a semi-religious vessel, being necessary to various domestic rites of the Hindus. The *ábkhora* or *bholna* is a drinking mug used almost exclusively by Musalmáns, and the *shakora* closely resembles it, being generally rather taller. Their price is three pies a pair. Of these water vessels the *surâhi*, the *abkhora* and the *shakora* are commonly made by Musalmán potters or *kasgars*, when they are to be found, while the rest are made by Hindu potters. But while Hindus often engage in the manufacture of the smaller drinking cups, Musalmáns appear to very rarely make large vessels such as *gharras*.

Owing to the religious prejudices of the Hindus, the use of earthen pots is practically confined to Musalmáns, except in the case of travellers, who cannot carry much luggage. Musalmáns and low caste Hindus use chiefly the *hándi* or *hanriya*. That used by Musalmáns is squat-shaped and wide-mouthed, as it is used for cooking

meat. The Hindu *hándi* is used only for grain and vegetables, and is a longer, narrower vessel. The price is about two pies. The *degchi* is much like the *hándi* and used for the same purpose. The *tandúr*, which is found chiefly among the Musalmáns of the northern districts, is a large egg-shaped jar heated by a fire which burns inside it. Bread is baked on the outside. The *kapari* or *karheiya* is a big platter on which both Hindus and Musalmáns parch grain. The *kundá* or *konrá* is a thick basin in which Musalmáns knead their flour. The *tawá* is a round plate on which bread is baked over a fire.

VESSELS FOR EATING OUT OF.—These again are used only by Musalmáns or very low caste Hindus. The *piyála* is a shallow bowl out of which meat is eaten after being served up in the *tabáq* (a large plate). Meat is also sometimes eaten out of the *rakábi, sanaki,* or *sainak*, which is like a soup-plate, but in this rice is more commonly served. The *chammal* and the *tashtari* are dishes rather smaller than a *tabáq*, and the *sifali* and the *chimli* much resemble the *piyála*. Of these vessels the larger are sold for about six pies each, and the smaller for one pie each.

VESSELS FOR STORING GRAIN AND DRY GOODS.—*Matkás* and *matkís* are the vessels most commonly to be seen in the shops of grain-sellers and in cultivators' houses, being used for storing purposes. When a larger vessel is needed a *daharú* or a *daharí* is used. The first is a cylindrical vessel sometimes as much as six feet high, and is generally of unbaked earth, made by the potter inside the house where it is to stand; the second is a small edition of the first, and is baked in the kiln. For storing pickles and tobacco a long jar called *martabán* or *amritbáns* is used by both Hindus and Musalmáns. It is generally covered with lac on the outside.

VESSELS FOR STORING MILK, OIL, &c.—The *dudhándi*, the *maliya* with a smaller mouth, and the *maheri*—all resemble one another, and are used for storing milk and making butter. The *gariya* is a round-bottomed flask in which *ghi* is kept. These all sell for about two pies.

VESSELS USED BY WINE SELLERS.—The *khujua* is a very small saucer, holding about a mouthful of spirit, supplied by licensed vendors gratis to their customers, who throw them away after drinking once. They are sold at the rate of 3,000 for Re. 1. The *bhurká* is a rough earthenware bottle holding about one seer, which often takes the place of a glass bottle.

PIPES AND THEIR PARTS.—Native pipes for tobacco-smoking consist generally of two parts—the *huqqa* or water-holder, and the *chilam* or tobacco-holder, these two parts being separated by the stem (*naicha*). Owing to the rule that an earthen vessel may be contaminated after touching water, no self-respecting Hindu can use an earthen *huqqa*, which is only found among Musalmáns and very low-caste Hindus. The *huqqa panchkora* has a saucer fixed on to its base, which is pierced with small holes. The water to be used for cooling the tobacco is poured into the saucer, and when the smoker begins to smoke, is drawn up through the holes into the body of the *huqqa*. The *huqqa gauriya* is smaller than the common water bowl, and is made at Benares and Allahabad; sold with the tobacco bowl for three pies. The *huqqa madariya* is smaller and lighter than most, and is sold for three pies with the tobacco bowl and the stem. It is peculiar to Lucknow. The common *huqqa* is sold for three pies alone. The *chilam* or tobacco bowl is sold at the rate of eight for three pies. *Chilams* made by Musalmán potters are for some reason usually considered superior to those made by Hindus, and they are peculiar for the broadness of the upper part (*chaturi*). The *chilam* for hemp-drug smoking is much narrower than that for tobacco, and has scarcely any bowl. It sells at the rate of twelve for three pies.

AGRICULTURAL VESSELS.—The most important of the vessels used in agriculture is the *kúnd*, which is tied on to a rope in order to raise water from the well for irrigation. Ten or twenty of these are often broken in one day by the cultivators using them, and their consumption is therefore very large. The *kúnd* is one of the vessels supplied in most districts in return for customary dues received from the cultivator. The *kalsi* or *kalsá* is shaped much like a *mitki*, and is used to contain the sugar-cane juice when first pressed out. The *nánd* is a large thick vessel used as a feeding trough for cattle.

The *chirágh* or *diya* is the common oil-lamp of the country, and is a tiny earthenware saucer holding about two chittacks of oil; the price is about one anna a hundred. The *dawait* is a small circular ink-pot, sold at four annas a hundred. The *gamla* is the common flower-pot, costing about Rs. 3 a hundred. The *makán ki jáli* is a pierced tile or screen set in walls to serve as a grating. The *nagara* and *nagaria* are hemispherical basins which are formed into drums by stretching parchment tightly across their mouths. They are sounded in temples on certain occasions.

CHAPTER III.

MATERIALS AND THEIR PREPARATION.—There are two kinds of clay which seem to be common to almost every district. The first is of a dark grey colour, sometimes nearly black, found at the bottom of every village tank or pond. This clay when baked by itself is of a dull red colour, and produces a very strong earthenware. It is accordingly used for large vessels such as *nánds* and *gharras*, and for all cooking pots that have to stand the fire. It is also used for all glazed ware. Its common name is *kálí mittí* (black earth), but there are many local variations. The second clay is light red or dark yellow, and is to be obtained in every district either on the surface of the ground or a few feet below it. It is more easily manipulated than the grey clay, but more brittle and porous. It is used for the manufacture of small articles, such as cups, saucers, and earthen lamps. In most districts it is known as *pilí mitti*, or yellow earth. Besides these two common clays, various districts contain special kinds. Thus in Bareilly, a whitish clay used for glazed ware is called *paterí mittí*. In Benares *kandai*, a light grey clay, is made into tiles. For the ornamental ware of Nizamabad in Azamgarh, a whitish flaky clay found at the bottom of one small pond, and called from the place *Bhairopur ki mitti* is used. The Chunár ware is made from two special clays called *nakti* and *khasi*; in Garhwál *chopari mati* is the name of a pink adhesive clay, and in Rae Bareli *pindrohi* is a whitish earth. The light brittle vessels of Amroha are made from a tenacious black clay called *gwalchaná*, and the porous goglets of Agra from a grey friable clay called *chila*. Lucknow, again, has a fine light grey clay known as *potá*, and the special clays round Naini in the Allahabad district, from which jail pottery is made, are *gharhoti*, *karái*, and *karbota*.

No true China clay, such as exists in a few places in the Panjáb, is to be found in the North-Western Provinces and Oudh, and the wares made are always red in colour unless glazed or painted externally.

Cost of Clay.—By the village potter the clay is always dug out of a tank or from the common waste lands, where there are well-known patches to which he resorts with his donkey or bullock. In the case of village potters no charge is made for this clay, as the potter in return supplies the landlords with household vessels for nothing. Town potters, however, have in most districts to pay for their clay, as they have nowhere a special patron from whom they can get it free.

Preparation of Clay.—The clay is usually kept in heaps outside the potter's door for two or three days before he prepares it for use. The black clay is kept in one heap and the yellow clay in another. When it is thoroughly dry it is pounded with a heavy wooden mallet called *mugari* or *mongri*, and is then sifted through a sieve or osier basket known as *chalni*, *chhulná* or *hangua*. In Farukhabad the pounded earth is sifted by being poured over an inverted *gharra*, when the coarser pieces roll far away, and the fine powder falls close to the *gharra*. In Hamírpur the sifting is done through the strings of a native bed (*charpoy*), held up slanting, while in Rámpur the clay is ground in a hand-mill. The coarser pieces of earth are next put into water and left till they are dissolved, when the fine powder is added, and the whole worked up into a stiff paste. This paste is now sliced either with a common sickle (*hasiya*) or with a two-handled bow-shaped instrument. In some places no slicing instrument is used, but the dough is merely kneaded with the feet or hands. During the process of kneading, any substances required to alter the consistency of the clay, strengthen it, or prevent its cracking, are added. Usually, yellow clay is mixed with black clay at this stage in varying proportions, as black clay alone is apt to be brittle. The proper admixture is sometimes discovered by making test vessels and seeing whether they crack on exposure to the sun. In all districts wood ashes or cow-dung ashes are added to the clay, both at the kneading stage and after the vessel has been shaped. This is done to prevent the clay sticking to the hand or the various instruments used in shaping it. To enable the clay to stand the heat of the kiln without cracking, river sand is added to it in the districts of Budaun, Bareilly, Sháhjahánpur, Hardoi, Bulandshahr, Garhwál, Basti, Sultánpur, and Kheri. The amount of sand is, in most cases, about one-tenth of the whole mass; but in Basti it is stated to be as much as one quarter; and in Kheri, where the clay must be most unsuitable for pottery, fine sand is added in the proportion of one to four for common articles, and for cooking vessels the mixture is composed half of clay and half of coarse sand.

In most districts, however, where sand is not easily to be had, chaff, husks, or chopped straw are added to the clay, making about one-twentieth of the whole mass. Lucknow appears to be the only district where there is not a single instance of the admixture of either sand or chopped straw with the materials from which common vessels are made, whence it may be concluded that the Lucknow clay is especially well-adapted to the purposes of the potter. Various other substances are sometimes used for the toughening of the clay. In Sháhjahánpur and Aligarh two and a half tolas of cotton-wool are mixed with one seer of clay for common ware, and for the Aligarh pottery known as "kankar" ware pounded nodular limestone is added. In Rámpur, Hamírpur, and Bánda powdered horse or mule dung, or rotten paper, are some of the ingredients; while the makers of the Lucknow figures prepare their special paste by mashing up a half seer of *babul* tree gum, one seer of *belgiri*, half a seer of brown paper, and half a seer of old cotton-wool with one seer of common black clay.

This sifting and kneading of the clay takes, as a rule, about three days, though sometimes one day only is spent on this work. Enough clay is ordinarily prepared at one time for the fashioning of one batch of vessels. When it is quite ready, it is made up into round balls weighing from seven to twelve seers, and is stored either inside the potter's house or in a pit about five feet in depth. Here it is usually left for at least three days, until it has lost some of its superfluous moisture, when it is ready for the wheel.

The coloured earth called *kabiz* is prepared for application by admixture with the saline earth called *reh*, pounded mango bark or catechu and *babul* gum. The leaves of other shrubs are sometimes added. These are all pounded in a mortar mixed with rain or pond water (never with well water), and left to ferment in a pot for three days. At the end of that time the muddy solution is strained off, and is ready for use.

CHAPTER IV.

Throwing on the Potter's Wheel, Pressing in Moulds and Baking.—All earthenware—except the very largest vessels, toys, a few ornamental wares, and some special articles, such as pipe-bowls and water goglets, are fashioned on the wheel. The technical term for this in English is "throwing," and in Urdu *bhánná* (to twist round), or *chák par gondá márna* (to beat the clay lump on the wheel).

Potters' wheels are of three kinds (No. 57). The first, and commonest, which is found in every district, is the single wheel (*chák*), turned by hand and supported on a wooden axis turning in a pivot fixed to the ground. The second is identical in shape with the first, but instead of resting on a pivot it has a ball of lac attached to its under surface, on which it revolves. It is called *kunda*, is turned by the hands or feet, and is peculiar to Hamírpur. The third is a double wheel fitted into a pit and turned by the feet. It is used only in Rámpur, Muzaffarnagar and Meerut. The common *chák* is made either of clay, stone, or wood—most commonly of clay. The clay wheel is made by the potter himself from ordinary black earth mixed with goats' hair, and dried in the sun. In some cases cross pieces of wood are let into the under surface of the wheel to strengthen it; and in Almora the wheel is composed of two cross boughs, between which twigs are woven and tied together with ropes, the whole being covered with a thick coating of clay. The diameter of the wheel is about 3 feet, and the thickness 3 inches; its weight is about 2 maunds. In the centre of the upper surface a slab of baked clay or stone is let in. In the centre of the under side is a stone slab, in the middle of which is a hole for the axle. The axle itself is a wooden or iron pin. The lower end of the axle is either fitted into a wooden block fixed to the ground, or into a hole in the ground stuffed with rags. On the upper surface of the wheel are four holes near the circumference, into one of which the turning stick is fitted. The turning stick, which is about 3 feet long, has a large number of names. A wheel of clay can be made in four days and costs the potter nothing. It lasts for about five years. A stone wheel, which

will last a lifetime, costs on an average Rs. 4, and is usually brought from Mirzapur or Indore. A wooden wheel lasts for about ten years and is made by a local carpenter for Re. 1-8.

The *kúnda* is used only by the Hundairia potters of Hamírpur, and is said to turn out coarse and misshapen vessels. It is probably the primitive form of the wheel, and as such is interesting. It is a clay disc with a slight hollow in the centre of its lower surface, to which a small hemisphere of lac is attached. This hemisphere serves the purpose of an axle, and revolves on a slab of stone or wood resting on the ground.

The double wooden wheel consists of two wooden discs fixed two feet apart on an axle 2 feet 6 inches long. The smallest disc, about 10 inches in diameter, is that on which the clay is worked. It is called *patri*. The axle is called *masal*, and the larger disc 2 feet across is named *bará chák*. The whole wheel is placed in a pit about 3 feet deep, the smaller disc being on a level with the surface of the ground. The axle turns on a stone slab at the bottom of the pit, and is kept upright by a cross-beam with a hole in the middle, through which it runs. The worker sits on the edge of the pit, and turns the wheel by pressing the lower disc with his right foot. The motion of this wheel is more even and continuous than that of the single wheel, and is used for the finer kinds of pottery at Rámpur and Meerut.

Other Instruments used in Throwing.—(1) The cutting string.—For small vessels a lump of clay containing material enough for several articles is placed on the wheel, and each vessel as it is moulded has to be separated from the rest of the lump. This is done by drawing a string gently through the clay at the place where it is to be cut, while the wheel is turning at full speed. The string is sometimes attached to a light handle of reed. In Fyzabad, larger vessels are separated with a thick knife called *tor*.

(2) The pestle and mallet (No. 58).—A large vessel, such as a *gharra* or *hándi*, is only roughly formed on the wheel, its sides being much thicker and its whole shape narrower than that of the finished vessel. The rough shape, while still damp, is rounded and enlarged by being beaten out with a pestle (*pindi*) and mallet (*thápá*). The pestle is an earthenware disc with a round handle, and the mallet resembles a thick, flat, wooden ladle. The pestle is held in the left hand against the inside of the vessel, while with the mallet in his right hand the workman beats the outer surface over the spot where the pestle is held. The pestle is also used for beating out the flat bottoms of such vessels as have their parts fashioned separately.

(3) The rest or support for unbaked vessels.—While the vessel is being shaped, as described above, it is held up in a rest, which is usually the semi-circular half of an old *gharra*, but is sometimes the thick basin called *kúnda*, and sometimes a specially prepared hollow earthenware cone (*ánthra*).

(4) The water-jar is kept by the side of the wheel, and the potter continually wets his hands in it as he works. The cutting thread is always kept soaking in this jar. The yellow clay used for small articles is also usually kept wet in the water-jar. In one or two districts a basket of sand stands near the wheel for the potter to dry his hands in, when necessary.

(5) The slab.—Before being placed on the wheel, the prepared balls of clay are brought out and kneaded together on a stone or wooden slab called *patri*.

(6) Polishing and scraping instruments.—Pipes, bowls, goglets, and a few other articles are polished and scraped before being baked, after they have dried for a few hours. For this purpose they are fixed a second time on the wheel, which serves the purpose of a turning lathe. The commonest scraping instrument is a hollow hemisphere of iron with a circle cut out of its bottom. Both the edges of this circle and the rim of the hemisphere itself are applied at various times to the outside of the vessel which is being polished. This instrument is in most districts called *khuria*. Besides this, an iron blade called *chelni* is often used. After the scraping, the final polish is given by pressing against the revolving vessel either an earthen cup, a shell, a stone, a peeled stick, or a piece of cloth.

(7) The designing chisel.—Incised ornamentation and lines are produced by drawing on the unbaked vessel with a thin pointed chisel. A sharp pebble is sometimes used instead.

(8) The brush.—The reddish-coloured earth *kabiz* is applied to all vessels made by throwing with a brush (*qalam*) or a rag.

Method of Manufacture.—A *gharra*, *hándi* (No. 58), or other big vessel is made as follows:—The potter takes his lumps of prepared clay out of the pit where they have been drying for two or three days, kneads them together on the slab, wets his wheel, and places about three seers of the clay on the earthenware centre. Then he starts the wheel with his hands, takes up the turning stick, and deftly fits it into one of the holes on the circumference of the wheel as they pass round. Grasping the upper end of the stick with his right hand and the lower with his left, he gives it a few vigorous turns, and the wheel is set spinning so evenly and steadily that it will show no signs of falling for at least five minutes. He now throws aside his stick, squeezes the lump of clay with both hands, and thus twists it into a short spiral mound technically known as *jár*. Into the centre of this mound he plunges his right fist until he has made a hole, into which he inserts the thumbs of both hands, and presses outwards with the ball of each thumb in opposite directions until he has produced a symmetrical basin in the top of the stand of clay. Then he stretches his fingers down the outside of this basin and pulls up the rim evenly all round, gradually narrowing the diameter: during all this operation his hands have been continually moistened in the water-jar. The rough shape of the vessel is now revolving on the top of the pillar of clay. The potter takes the cutting string from the water-jar, and separates this rough shape called *bút* from the pillar. The result is a cylinder of moist clay, slightly bulging in the middle and without a bottom (No. 57). Some workmen, however, by applying the cutting string lower down the clay pillar, secure a bottom to the rough shape. The practice differs in different villages and depends on the tenacity of the clay. This cylinder is placed in the earthenware rest, and left to dry for 24 hours. It is then taken out of the rest and placed on a board, and its bottom is filled in on this board with kneaded clay, manipulated by the potter's fingers. Cow-dung ashes are now sprinkled over the whole vessel, and it is beaten out with a pestle and mallet. When the final shape has been arrived at, the vessel is set aside to dry for another period of two days. It is then brought out again, and a solution of common yellow earth is spread over it with a rag. This process is called *múnj*. The vessel is now once more dried for 24 hours, and

then a solution of the rust-coloured earth (*kábiz*) is applied to the upper half with a brush or rag. It is next set aside for a final drying of two days, and is then ready for the kiln. The whole process of preparing a *gharra* for the kiln thus takes about seven days.

THE KILN FOR COMMON WARES.—The kiln for common red pottery and the coarser kinds of coloured wares consists of a circular pit about 3 feet deep and about 8 feet in diameter. At the bottom is always left a layer of the ashes of former bakings about 3 inches thick. On these is set a layer of cow-dung cakes, and above this alternate layers of vessels and cow-dung cakes, each successive one of which lessens in diameter, so that the whole pile is shaped like a cone. The unbaked vessels are always placed with their mouths downwards, slightly inclining towards the centre, and are built up round two bottomless *gharras* placed one above the other in the centre, to serve as a chimney. The whole cone-shaped pile is covered over first with cow-dung, then with straw and last of all with clay. Several holes are pierced in the covering all round the kiln near the ground, a smouldering piece of cow-dung is dropped down the chimney, and the furnace becomes lighted and burns itself out in about 24 hours in the hot weather and in about 36 hours in the rains.

THE KILN FOR FINE WARES.—The kiln for the baking of finer wares and glazed pottery is universally called *bhatti*. It is a cylinder about 5 feet high, built either of bricks or clay, divided into two stages by a pierced flooring of clay, or (as at Aligarh) of perforated iron. There is a door for both stages, the upper of which holds the articles to be baked, while the lower is the furnace. When the upper stage has been filled, it is roofed over with round earthen platters and the fire is lighted. The fire is put out after about 24 hours, and the kiln is allowed to cool for 6 hours, when the vessels are taken out.

CHAPTER VI.

ORNAMENTAL WARES.—The Chunar pottery (No. 49) is quite distinct from any other kind produced in these Provinces. Its colour is a dark brown, approaching, when glazed, to black, and is apparently due to the use of the special clays noticed in Chapter II. The ornamentation and shape of the wares is purely English, and generally classic in character. In the whole range of patterns, which is very large, there is hardly one to be seen bearing any traces of Oriental origin. The Azamgarh pottery (No. 49) is a black and reddish-brown ware ornamented with designs in silver foil. After the baking, silver foil or an amalgam of mercury and tin is rubbed with the thumb nail into lines etched with a sharp instrument on the unbaked ware. The articles produced are chiefly tea-pots, sugar-bowls, candle-sticks, vases, and the like, the price of which is very moderate.

The ornamental pottery of Lucknow (Nos. 52 to 56) is of four kinds:—(1) Goglets, plates, cups and saucers ornamented with simple designs in bright unglazed colours. (2) Trays, plates and vases painted with varnished colours, the background of red ochre, gamboge, aniline purple, or cochineal, and the designs in solder, white lead, or native ink. The effect is brilliant and bizarre, and the patterns attractive. (3) Models of fruit and vegetables. These models are at once the cheapest and best of all those made in India, being acknowledged superior to those of Krishnagar and Poona. Every conceivable fruit and vegetable is imitated, from a huge bunch of plantains or a jack fruit to a dried onion, and the colouring is very realistic. (4) Lucknow figures (No. 53). These celebrated figures differ from, and are superior to those of Krishnagar, from the fact that the modellers do not use actual hair, wool, pieces of clothing, and other accessories for their decorations, but use clay instead, which gives them greater durability. The larger figures are realistically coloured, while the smaller and cheaper ones are coated with red ochre, which, when dried, presents the appearance of Italian terra-cotta. Moulds are used for the trunks of the figures alone. The artists model the head and face, the curves of the body, and the limbs with their fingers and a graving tool. These figures are very cheap.

BULANDSHAHR, MEERUT AND RÁMPUR POTTERY (Nos. 48 and 50).—This glazed pottery, which is properly called a faience, has a red earthen body covered with an opaque white enamel, in which flint is a large ingredient, painted chiefly in dark blue and turquoise, but sometimes in claret colour or yellow. The designs, which are strictly conventional, are drawn by artists who receive from 8 annas to Re. 1 a day. This ware is the most effective of the various kinds manufactured in the Provinces, and owes much to the interest taken in it by the late Mr. Growse and His Highness the Nawáb of Rámpur. In style it resembles almost exactly the ware of Multán, whence its manufacture was originally introduced.

AMROHA POTTERY (No. 50).—This is a peculiar, thin, and brittle ware, white and ornamented in colours and in gold and silver leaf. The lightness of the ware is due to the special qualities of the clay of which it is made. Before baking, the vessel is covered with a coating of *kharya mitti*. For the application of the gold and silver leaf the pattern is broadly marked in wax, and the leaf put on over this.

ALIGARH POTTERY (No. 51).—This pottery resembles that of Chunar in style. The ornamentation is European in character, consisting of fruits and flowers in relief, which are impressed in moulds and affixed to the surface of the pottery before baking. The ware is coal-black and slate coloured, and the main ingredient is *kankar* (carbonate of lime).

POTTERY OF GONDA AND SITAPUR.—At Atraula in Gonda and at Biswán in Sitapur, *gharras* and other common vessels are painted by local artists in flower patterns (Nos. 47 and 48). The designs have been entirely unaffected by European influences, and are consequently uncommon and delightful.

CHAPTER IX.

THE GLASS TRADE.—The manufacture of glass was known in ancient India as early as 800 B.C., for in the Yajur Veda, generally supposed to have been written about that time, glass is mentioned as one of the articles of which female ornaments were made. It is also noticed in the Mahábhárata, and in an old book called the Yuktikalpataru the effects on the human system of drinking water out of a glass tumbler are stated to be the same as those of drinking out of a crystal cup. In more recent times, during the sixteenth century, the glass of India is said to have been exported in large quantities to Europe; and in the north of Italy there is a tradition that the Venetians at one time obtained, if not their raw glass, at least its ingredients, from the plains of Hindustán.

CHAPTER XII.

THE MANUFACTURE OF BLOWN ARTICLES MADE OF COUNTRY AND EUROPEAN GLASS (No. 57).—Small phials and flasks for holding Ganges water are blown in Aligarh, Bareilly, Bijnor, Bulandshahr, Etah, Rae Bareli, and Saháranpur. In Saháranpur are also made (by blowing) syphons, toys full of coloured liquid called *panchkora*, and glass mouthpieces for *huqqas*. These are all apparently made from country glass. In Benares, Dehra Dún, and Lucknow are made (by blowing) pickle-jars, small lamp globes, lamp chimneys, vases and phials from European glass. In Benares also there are four workshops which turn out the thin glass known as *tikli* glass, used for the manufacture of the *tikli* or glass patches worn on the forehead by Hindu women.

The furnaces (No. 59) for the manufacture of blown articles are in all districts called *dás*. They vary considerably in shape, but all resemble one another in the possession of at least one annealing oven. They are always built under a roof. The following is a description of the furnace in use in Lucknow. This furnace is a clay cube about 5 feet high, 10 feet long, and 3 feet broad, built over a pit in which the wood burns. It is divided up into two storeys. The lower front compartment is directly above the fire, and its floor is pierced with a hole through which the flames come. This lower front compartment is used for the melting of the glass, which is held either over the flames until it is soft or fused in a large crucible called *khudda*, which is let into the floor of the melting compartment, so that its bottom is above the actual fire. The melting compartment has one large horse-shoe shaped door in front and smaller ones on each side. In front of the large door is an earthenware screen with a semi-circular groove in it, called *adí*. This serves as a rest for the rod, at the end of which the vessel is twisted round at one of the stages of manufacture. The upper front compartment and the two back compartments are annealing ovens (*aodán*) for the cooling-off of the vessels when made. The upper front compartment is the hottest and the lower back compartment the coolest. The vessels are left to cool in each compartment for four hours before being exposed to the outside air. The fuel used is wood.

TOOLS USED.—The tools (No. 59) used in the manufacture of blown articles are:—(1) *Nál, phúnkna*, or *dhotáli*, an iron blow-pipe, usually a piece of an old gun barrel. (2) *Kúnd, kunj*, or *sarhendi*, a solid bar of iron which is attached to the bottom of the bubble of glass when blown. (3) *Mála*, a dagger-shaped pressing instrument. (4) *Másá* or *máshá*, pincers of stout iron wire, shaped like a big hair-pin, used for working the rough edges of an article into shape and separating it from the blow-pipe. (5) *Chimta* or *ambár*, broad iron tongs for placing broken pieces of glass in position in the furnace. (6) *Síkh*, iron spit for moving about and turning over the melted glass. (7) *Sil*, slab of stone on which the end of the blow-pipe is rolled round to squeeze together the pieces of glass picked up. (8) *Chakal*, a disc of warmed country glass by which a lamp-chimney is fixed on to the *kúnd* (iron rod) in one of the final stages of manufacture. The country glass, being a different substance from the European glass, does not coalesce with it, and is easily detached when the chimney is complete.

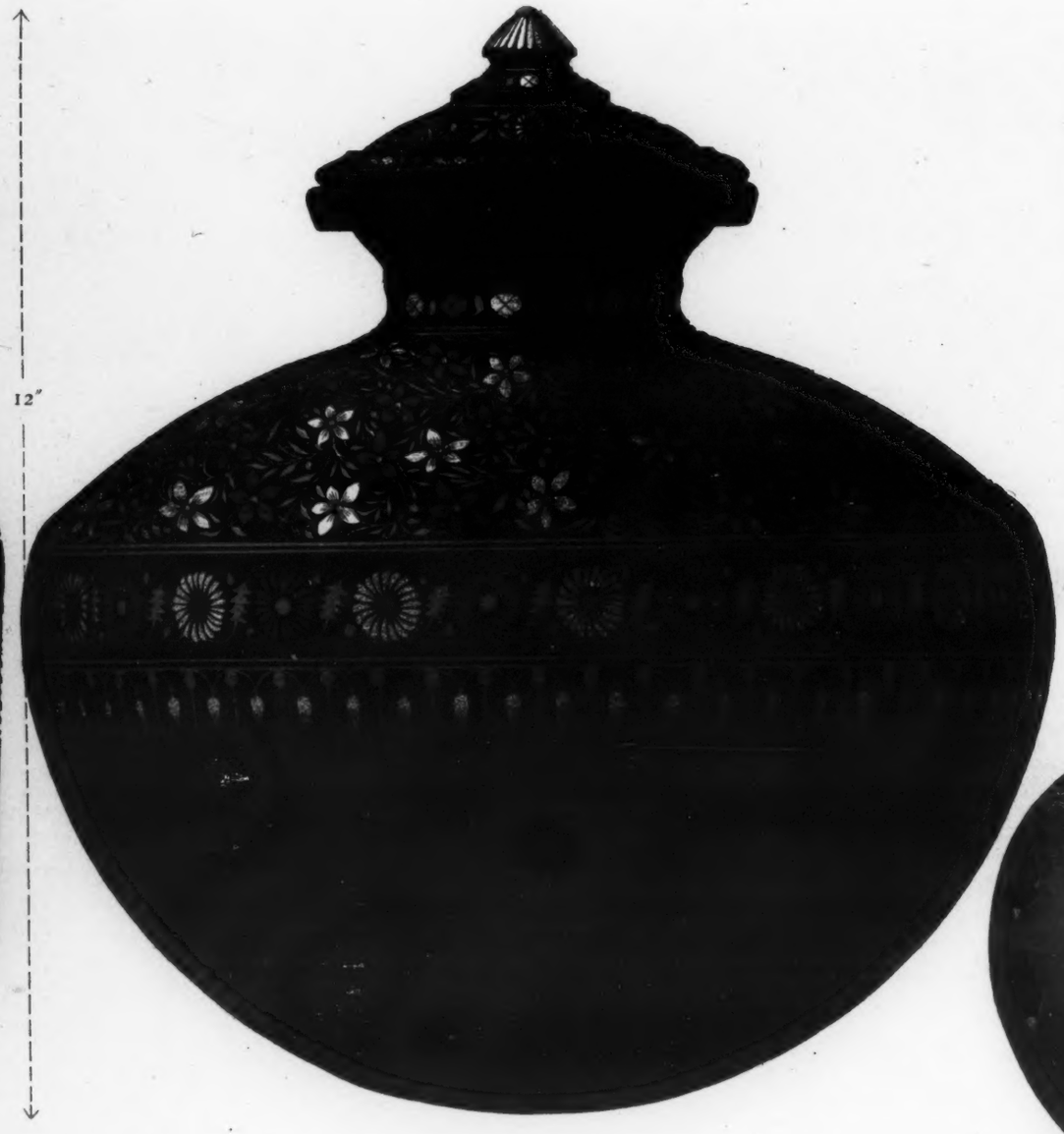
PROCESS OF MANUFACTURE OF BLOWN ARTICLES.—The process of blowing is practically the same in all districts, whether conducted with European or country glass. The following is a description of the making of a glass pickle-jar or *achári* at Lucknow:—There are two workmen engaged at the furnace. A broken tumbler is placed on the floor of the front melting compartment, or the edge of the hole through which the flames of the fire are shooting up. After about five minutes the first workman takes it up with the tongs, and attaches it to the end of the blow-pipe, which he has previously smeared with a gum made of saltpetre, borax, arsenic and water. He then hands it on to the second workman, and receives from him a second blow-pipe with a fused mass of glass attached to its end, which he will blow and shape while the fragment of the tumbler is in the hands of the second workman. The latter holds the fragment of the tumbler over the fire at the end of the blow-pipe for about five minutes until it is thoroughly fused, when he takes it out and rolls it round on the stone slab, patting it into a round ball with the dagger-shaped tool called *mála*. After this he plunges it into a jar of water to cause all the air-bubbles to escape, and fuses it again over the flames for another five minutes. He then hands it over to the first workman, who warms it once more, and then blows into the pipe for about ten seconds till a bubble one inch long protrudes from its end. He repeats this warming and blowing process three times, until the bubble is four inches long. Then he places the blow-pipe on the grooved rest in front of his furnace, so that the bubble of glass is over the flames, and twirls it rapidly round in order to get the shape even. After this he swings the blow-pipe twice round his head, elongating the bubble by the centrifugal force, and warms it again. This swinging and warming process is repeated five times. He then flattens out the bottom of the bubble by pressing it against the side of the furnace. Next he takes the *kúnd*, a solid bar of iron, and sticks it into the centre of the bottom, making the bottom rise into a cone inside the vessel. The glass bulb is now held between the blow-pipe and the iron bar. The workman next takes the tweezers of stout iron wire, dips them into water and grips the stem of the bulb with the tweezers just at the point where the blow-pipe inside the stem ends. The stem cracks round this line under the touch of the moist tweezers, and the blow-pipe is left with about three inches of neck round its end, while the main body of the vessel is stuck by its bottom to the iron bar. The fragment on the blow-pipe is knocked off, and put among the broken glass to be melted up again. The workman now turns the iron bar, to which the incomplete vessel is fixed, on the socket in the screen before the furnace, until the rim is well warmed. He then takes it out and works the tweezers about inside the rim of the vessel till he has got it to the proper shape. The vessel is then cooled for four hours in each of the three annealing ovens.

LIST OF ILLUSTRATIONS.

47.—Biswan and Gonda Pottery. 48.—Bulandshahr and Gonda Pottery. 49.—Chunar and Azamgarh Pottery. 50.—Amroha and Rámpur Pottery. 51.—Aligarh Pottery. 52.—Lucknow Pottery. 53.—Lucknow Clay Figures. 54, 55, 56.—Lucknow Pottery (1 to 116). 57.—Lucknow Glass Ware. 58.—Various Articles of Pottery. 59.—Furnace and Tools used in Glass-making.

47.—Biswan (Sitapur) and Gonda Pottery.

Bulandshahr.



Gonda.

Bulandshahr.

DRAWN BY
BHAIRAV BAKHSH AND FAZLUD DIN
ARCH. SURVEY, N.W.P.

49.—CHUNAR (1, 2, 3) and AZAMGARH (4, 5, 6, 7) (Nizamabad) POTTERY.

50.—AMROHA POTTERY (1,2,3,4) painted.
RAMPUR POTTERY (5,6,7) glazed.

DRAWN BY SOHAN LALL.
ARCH. SURVEY. N.W.P.

DRAWN BY SOHAN LALL,
ARCH. SURVEY, N.W.P.

51.—ALIGARH POTTERY, unglazed.

Size of originals.

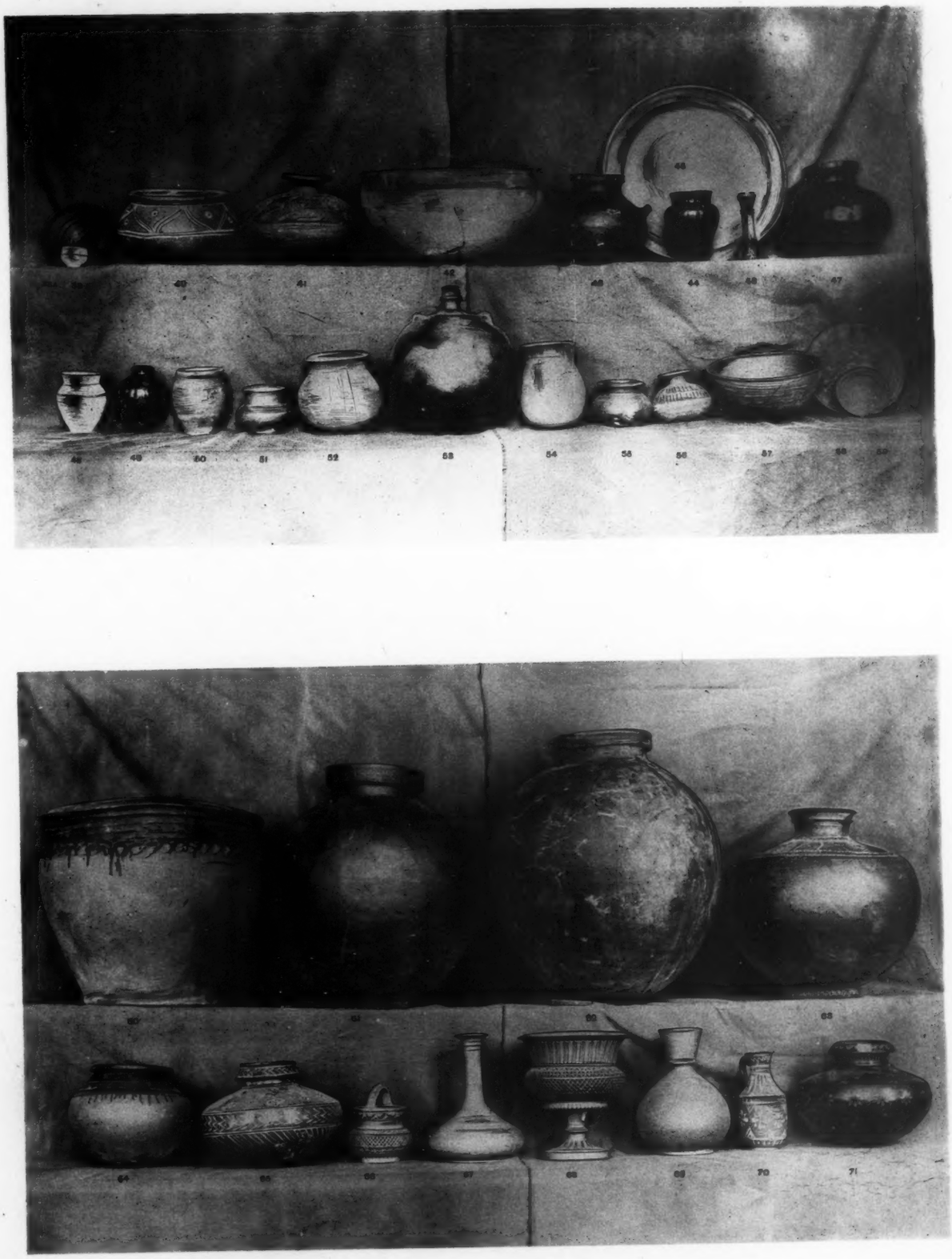
DRAWN BY FAZLUD DIN II.
ARCH. SURVEY, N.W.P.

52.—LUCKNOW POTTERY.

DRAWN BY BHAIRAV BAKHSH.

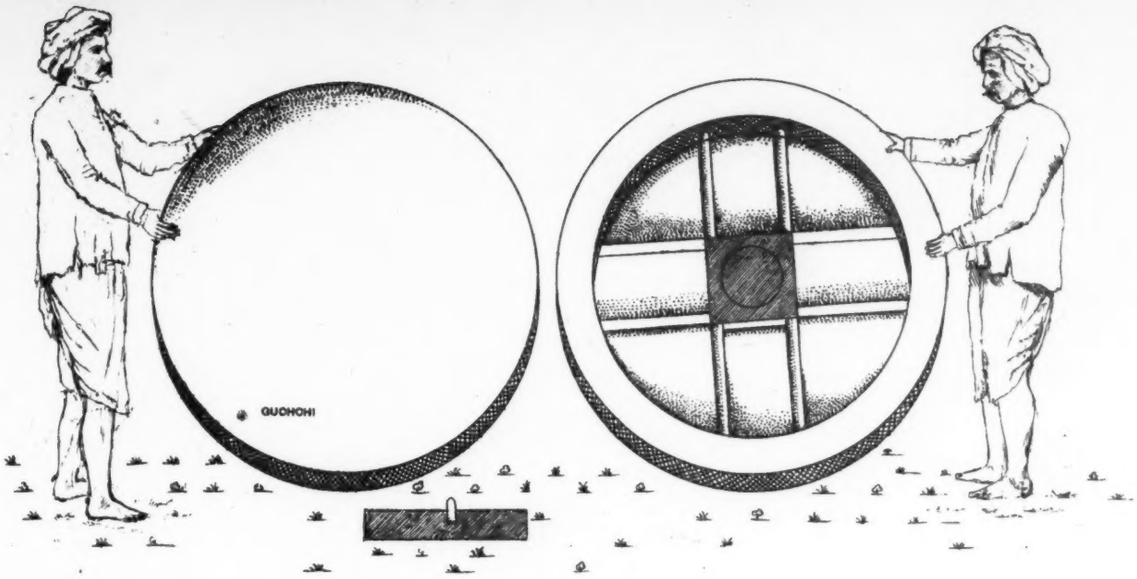
53.—LUCKNOW CLAY FIGURES.

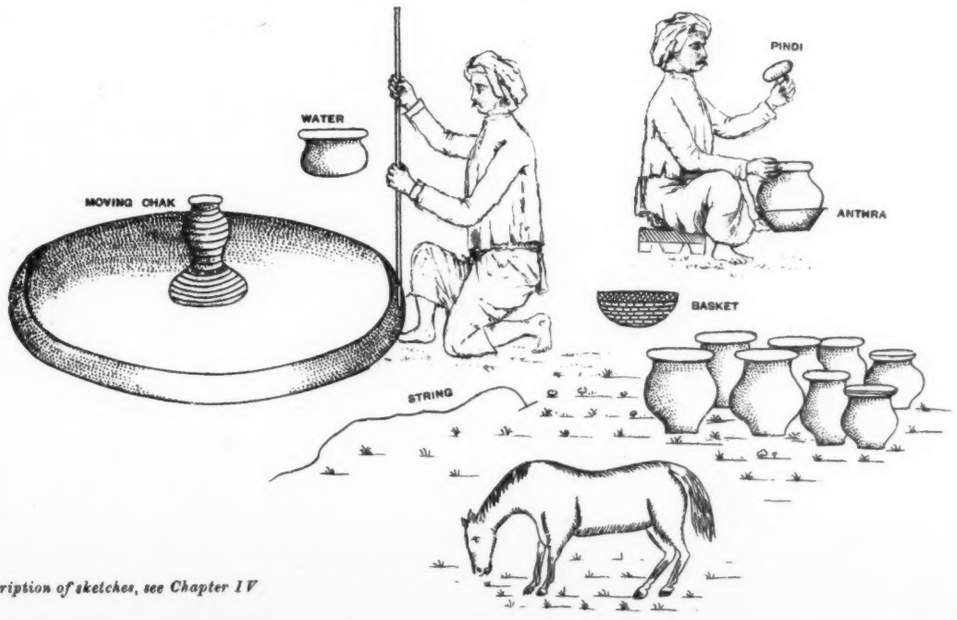
54.—Lucknow Pottery (1 to 38).



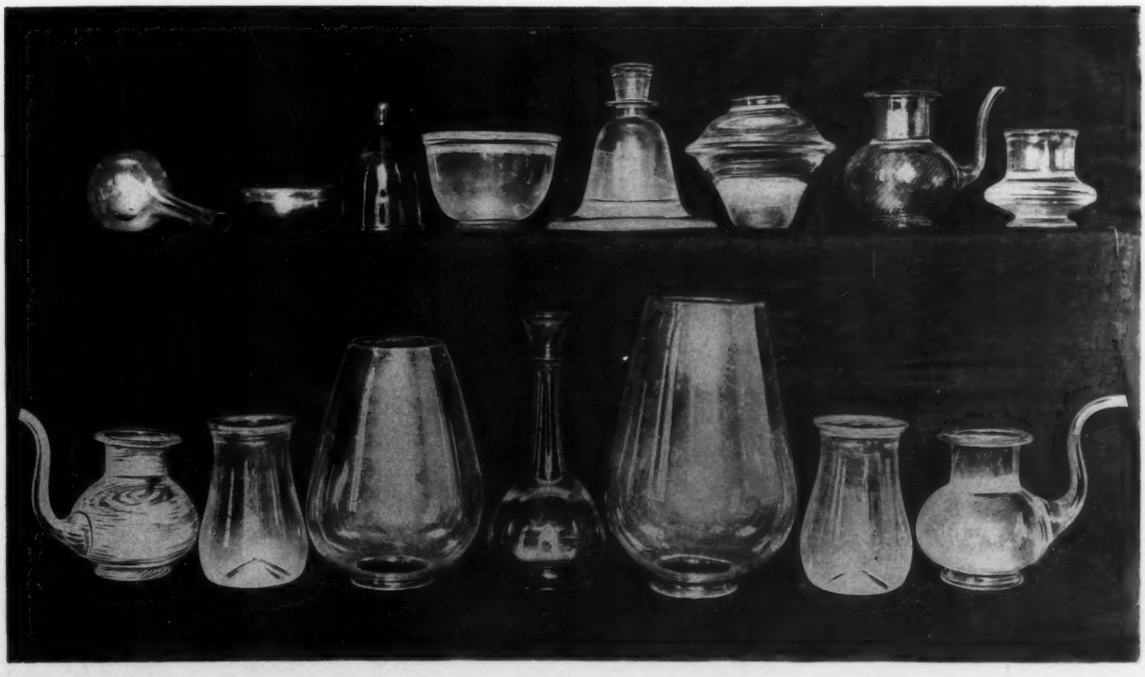
55.—Lucknow Pottery (38a to 71).

56.—Lucknow Pottery (72 to 116).



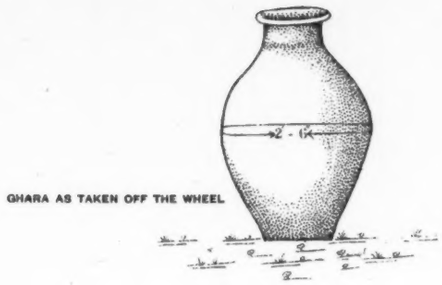


For description of sketches, see Chapter IV

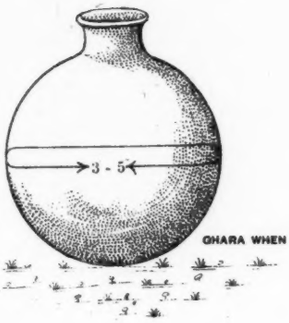


57.—LUCKNOW GLASS WARE (see Chapter XII).

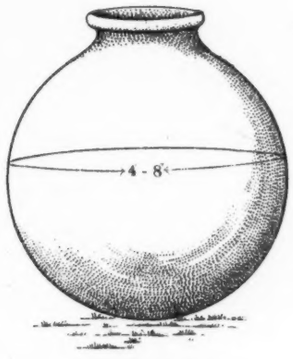
A = THAPPI.
B = PINDI.



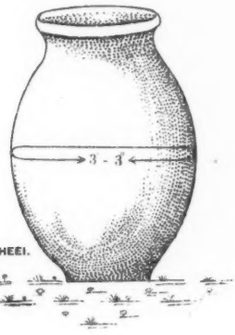
GHARA AS TAKEN OFF THE WHEEL



GHARA WHEN BEATEN OUT



MAT WHEN BEATEN OUT

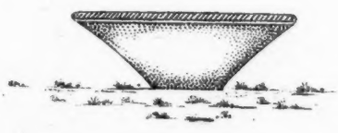


MAT WHEN TAKEN OFF THE WHEEL

MATKENA TABAQ SHAKORA

HANDI

HANDI



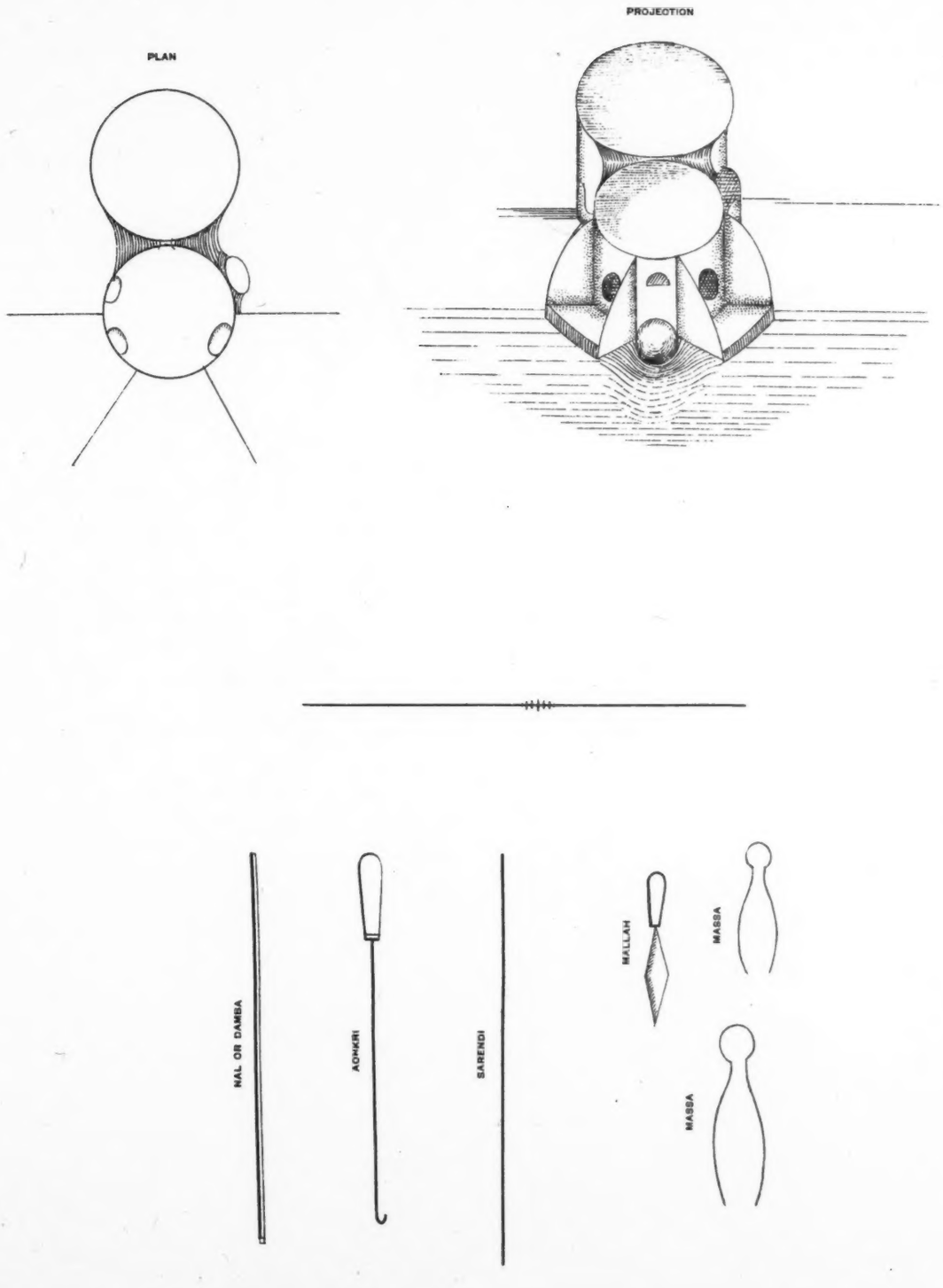
KUNDA

KUNDA

SURAHI

GHAMLA, FLOWER POT

58.—Various Articles of Pottery.



59.—Furnace and Tools used in Glass-Making.

The Journal of Indian Art and Industry.

MADRAS POTTERY.

By Mr. EDWIN HOLDER, Acting Superintendent Madras School of Arts.

PREFACE.

Every one who has been in Madras will, I feel sure, agree with me that as regards the present manufacture of pottery in South India, there is very little that is at all interesting. And were it not for the discovery of antique pottery in old tombs, and the existence at present of a few schools where the manufacture of pottery of a superior quality is taught, there would be literally no material for a Report of this nature, which it is intended should be comprised chiefly of illustrations.

The oldest records that I have been able to obtain of the discovery of antique pottery in Madras, are some letters and notes published in 1856 in *The Indian Journal of Art, Science and Manufacture;* and a short account in the Report of the Madras Exhibition of 1857. For further information and specimens I am deeply indebted to Mr. E. W. Stoney and Mr. J. R. Sandford, of the Madras Railway, who had themselves discovered large quantities of pottery in old graves.

For the short history of the potters of Madras I am indebted to Dr. J. Pulney-Andy, who, on a former occasion, very kindly contributed an account of the artisan class for my monograph on "The Brass and Copper Ware of Madras"; and for information regarding the present manufacture of pottery in various towns and villages of the Madras Presidency I am much indebted to the Collectors of the several Districts.

Edwin Holder.

I. ANTIQUE POTTERY FROM OLD TOMBS.

The ancient graves discovered in the Madras Presidency are described by various writers as cairns, cromlechs and tumuli, which differ from each other as regards construction and external appearance: some being raised above the ground, and others buried sometimes with only a large stone to mark the spot. The countless number of these primeval sepulchres affords matter for considerable amazement and doubt as to the age to which they belong; from cemeteries containing many hundreds to groups of five or six in a spot, they are thickly spread over the Southern districts. On the Mysore plateau and throughout Salem, Madura and Coimbatore, on the tops of mountains, in valleys and plains, in the middle of forests, among both dry and wet cultivation, by the side of rivers and tanks, and in fact in every description of country these remains of an unknown race abound. Their number and wide distribution in places now deserted, no less than in the cultivated tracts, would argue a population larger and more generally dispersed than the present. The Neilgherry and Koondah Mountains possess a peculiar kind of these ancient sepulchres not to be found on the plains, while the cairn of the low country does not occur on those hills; though there are many on the Shevaroys. The Pulney Hills are destitute of any kind of these remains, and so are Malabar, Canara, and generally the western coast.

The usual appearance of the cairn is that of a heap of stones surrounded by rings or circles of black fantastic rocks half buried in the ground. The tomb, which is underground below the heap of stones, is in the form of a rude box composed of four long slabs for the sides, bottom and top, and two short slabs for the ends. The contents of the tomb usually consist of pottery, human bones, personal ornaments, and iron implements.

Besides these stone cairns, another species of sepulchre is found in still greater abundance—namely, huge jars of coarse pottery (see No. 64), about three feet deep and two feet in diameter at the widest part, buried usually a foot below the surface of the ground, together with a number of smaller urns and *chatties*, which are generally placed mouth downwards. There is usually nothing to mark the spot where these are buried, though sometimes a single flat stone is placed on the top, but never surrounded with the circle of stones as in the case of the cairns. These huge jars are filled with earth, and contain at the bottom a quantity of bones broken small, and one or two smaller urns also containing fragments of bones and a kind of fine white sand quite different from the surrounding earth. It is supposed that these peculiar graves mark the resting places of the poorer classes, as do the great stone cairns those of the wealthier. Plate 64, fig. 1, shows the contents of one of this sort of graves, discovered near Mettapollium by Mr. J. R. Sandford.

The earthen vessels found in these old graves comprise not only urns, but jars, *chatties*, vase-shaped vessels with covers, shallow dishes, cups, and other similar utensils. Most of those shown in No. 63 are rounded at the

bottom or taper to a point. They were no doubt intended to be placed on the stands on which they are represented, and which are usually found together with them. The centre figure in No. 60 shows this more clearly by the difference of colour between the vessel and the stand on which it rests. A peculiar jar on four legs, which is decidedly characteristic of the simplicity of ancient forms, is shown in Nos. 61 and 64, fig. 1. This vessel was no doubt intended for some special purpose, as it is not so common as some of the other patterns.

Besides the great variety of forms there is also some difference in the colour of the various specimens of this ancient ware, but apparently very little as regards the quality of the material. The large vessels are usually of a plain red or buff colour, like ordinary unglazed earthenware; the smaller ones are sometimes of a fine polished black, but more frequently of a reddish brown ornamented with wavy lines of a lighter and brighter colour, and appear as though they had been overlaid with a thin transparent coating of red sealing-wax or shellac. The wavy line ornament has not been painted on the surface, but inlaid. This result was evidently obtained by scratching the surface of the unbaked ware with a toothed instrument resembling a comb, and then filling up the hollows with a lighter coloured clay than that used for the body of the vessel. The polish or gloss seen on the surface of most of these vessels is not really a glaze, as might at first be supposed, for on carefully examining the broken edges of some of the vessels, no thickness of glaze will be seen; and as narrow-mouthed vessels of this sort are polished only on the outside, it seems obvious to conjecture that this gloss was obtained by a process similar to some that are practised by native potters of the present day. The method most commonly known in Madras is that of rubbing the surface of the unbaked vessel with a species of seed or berry, worn as beads by the natives, thereby producing a polish which remains even after the vessel has been fired. Another method, as described by Dr. W. Hunter, is to rub the surface of the baked vessel with the juice of *Toothu* or *Abutilon Indicum*, a mucilaginous juice somewhat like gum, and then fire the vessel again. A kind of smear is thus produced which resists water and acids, though it can be easily scratched with a knife.

As regards purity of form, this ancient pottery far surpasses any of the same class now made in India; and by the great variety of its shapes, its decorations, and the quality of the ware, it bears a striking resemblance to some found in the old Etruscan and Roman tombs sketched by M. Brongniart in his famous work on Pottery. The tombs themselves are also similar to those discovered in Etruria, and undoubtedly belong to a prehistoric age.

II. MODERN MADRAS POTTERY.

The only kind of pottery which appears to be indigenous to South India is the coarse, unglazed earthenware manufacture in almost every town and village throughout Hindustan, comprising vessels for water, culinary utensils, tiles, flower pots, &c. These are made from almost any kind of clay procurable on the spot, which is neither properly ground nor tempered, but is used in its natural state by most of the native potters. No. 65 exhibits the utensils most ordinarily used in Madras by all the natives, particularly by the poorer classes, who cannot afford the luxury of brass and copper vessels. The colour of this coarse earthenware is usually a light red, as shown in No. 66, which exhibits a few other varieties of the same class of ware manufactured in the district of South Canara. The black specimens are sometimes made from a dark coloured clay which turns black when burnt; but most ordinarily from the same material as the red ware, the black colour being given by baking the articles in a gigantic jar with its mouth closed and plastered with clay. White, gray and buff pottery is manufactured in places where superior clay or kaolin can be obtained. A few specimens of white Arcot pottery and some Burmese ware are shown in No. 70. These also are unglazed, but are of a much finer material than the ordinary ware.

In describing glazed Indian pottery, Sir George Birdwood in his excellent manual entitled *The Industrial Arts of India*, particularly alludes to the glazed earthenware of Madura. Evidently this industry has declined considerably of late, for in South India at present there is no town or village to which the manufacture of glazed ware can be ascribed as an indigenous art. The only specimens of purely native manufacture that I have, till now, been able to procure in Madras, are some enamelled ballusters, *chillums* for smoking tobacco, &c., and jars. These are made in Arcot and about the town of Madras chiefly by Muhammadan potters, who very likely brought the recipes for enamelling earthenware from the North. The articles are not ornamented with designs in various colours, like the Multan and Bombay pottery, but merely enamelled with one colour throughout, chiefly a deep clear green made from copper, a subdued yellow like ochre, and various shades of brown—all more or less rich and transparent. There is not much demand for this enamelled ware, as the Hindus (who form the bulk of the population in Southern India) either prefer the ordinary cheap unglazed ware, which they can afford to change frequently; or the brass and copper ware, which is not only indestructible, but always retains its market value, according to weight and current price of the metal. As for ornaments, the house of an orthodox Hindu is without

even a vase or a flower pot. Hence the reason of the ceramic art never having been developed in South India, notwithstanding efforts made by the Government to improve the quality of the ware generally, by affording facilities for studying the art, as will be seen from the following account.

In 1850 Dr. W. Hunter, a most energetic English officer of the Indian Medical Service, started a drawing and engraving school, partly at his own expense; and in order to make the institution, in course of time, a self-supporting one, he opened in connection with it a pottery manufacturing department. In a short time Dr. Hunter succeeded in turning out some very fine specimens of terra-cotta ornaments for buildings, bricks, tiles, painted and glazed stoneware vases, gallipots, goglets, and a number of other useful articles. The Madras Government was not long in showing its appreciation of the public good done by Dr. Hunter. At first a liberal grant was allowed, and eventually the school was made a Government institution, and placed under the control of the Director of Public Instruction. Dr. Hunter continued to be in charge for some time, and on his retirement from the service was succeeded by Mr. R. F. Chisholm, who introduced many improvements in the manufacture of pottery, which in his capacity of Government Architect he had every opportunity of doing. Tiles and terra-cotta ornaments required for all the public buildings were supplied from the Madras School of Arts. As the demand for these articles increased rapidly, the Government considered it necessary to open another place exclusively for the manufacture of bricks and terra-cotta for public buildings, and in 1866 established a factory (not far from the School of Arts), which is known as the Government Brickfields. Since then the work in the pottery department of the School of Arts has been confined to the manufacture of superior ornamental and glazed ware, but more especially to the training of students in accordance with the main object of the institution, which is to afford sound instruction—both theoretical and practical—in the several arts and industries which are taught in it. English recipes and methods of work have been followed in the school as regards the manufacture of pottery, and some of the stoneware produced has been declared to be quite equal to the European articles sold in the market, both as regards quality of ware and finish.

The Native States of Travancore and Mysore have not been slow in following the example set by the Madras Government as regards the encouragement and spread of Technical Education. Schools of Art have been established in both places, and pottery is one of the industries taught in them, passed students from the Madras School of Arts having been employed as teachers. The glazed pottery of the Trevandrum School is equal to that turned out at the Madras School—if not better; the material certainly is whiter than any that can be obtained in Madras, and more closely resembles porcelain.

A word of praise is here due to the German missionaries, who have established a splendid factory at Mangalore. The roof tiles from that place are acknowledged to be the best in India.

Nos. 71, 72 and 73 illustrate the kind of pottery manufactured at the Madras School of Arts, and Nos. 74 and 75 the terra-cotta work executed at the Government Brickfields.

III. SHORT ACCOUNT OF THE MADRAS POTTERS AND THEIR WORK.

The potters of South India form one sect of the Hindus, called Kushavars, in Madras. It is supposed by themselves that they descended from a Brahmin father and Sudra mother, for the sacrificial earthen vessels, which are now made by them, were, according to the Vedas, intended to be made by the priests themselves. Some of the potters still wear the sacred thread, like the Kammalars or artisan class, in imitation of the Brahmins. This sacred thread is a thin cord, tied loosely across the body over the left shoulder and below the right arm. The potters are generally of the Sivite sect, they observe all the usual Hindu festivals and ceremonies, and do not permit the re-marriage of widows. They are generally illiterate, though some of their class have earned distinction as sound scholars, especially of late years. All their religious disputes are now settled by their own "Panchayats," and not referred, as of yore, to Brahmin priests. The women assist the men in their work, chiefly where delicacy of execution is needed. The wages of the potter vary according to age and sex, rather than according to ability. Women and boys earn from two to four annas a day, and men from six to twelve annas; a few earn as much as a rupee a day, but not more. On the whole, the potters are a poor class compared with the Kammalar class, which includes jewellers, metal-workers and wood-workers. Their occupation is, on that account, somewhat despised by the others.

The native potter's implements are few, and his mode of working very simple. In No. 67 is shown the potter's wheel, a clumsily constructed and defective apparatus. It is composed of several thin pliable pieces of wood or bamboo bent and tied together in the form of a wheel, about 3½ feet in diameter. This is covered over thickly with clay mixed with goat's hair or any fibrous substance. The four spokes and the centre on which the vessel rests are of wood. The pivot is of hard wood or steel. The support for the wheel consists of a rounded

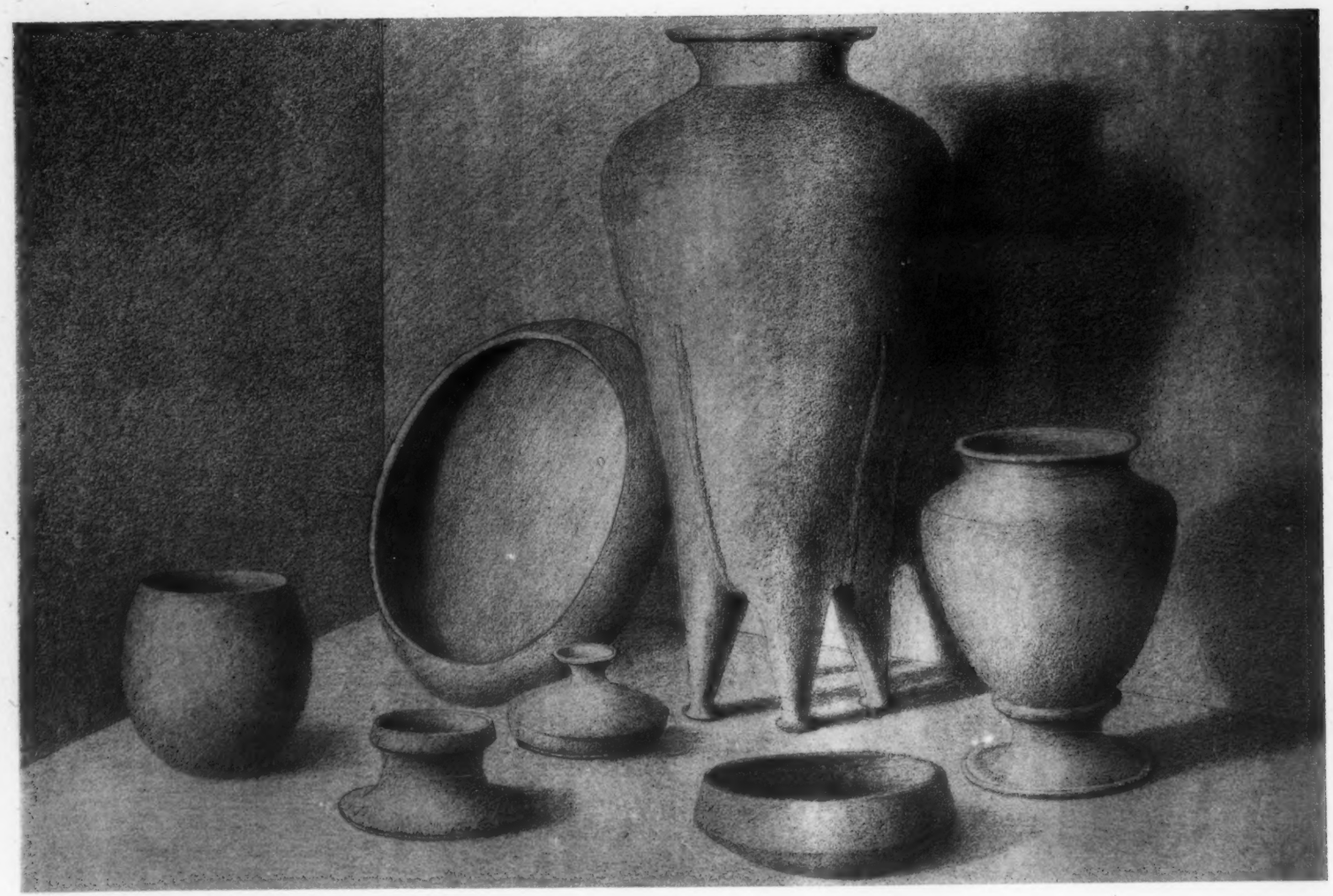
mass of clay and goat's hair, in which is imbedded a piece of hard wood or stone, with one or two slight depressions for the axle or pivot to move in. The wheel is set into motion first by the hand, and then spun rapidly by the aid of a long piece of bamboo, one end of which fits into a slight depression in the wheel, as shown in Nos. 67 and 68. The defects in the apparatus are—firstly, its size, which requires the potter to stoop over it in an uneasy attitude, as shown in No. 69; secondly, the irregularity of its speed, with a tendency to come to a standstill, and to wave or wabble in its motion; and thirdly, the time and labour expended in spinning the wheel afresh every time its speed begins to slacken. Notwithstanding, however, the rudeness of this implement, the native potters are expert at throwing, and some of their small wares are thin and delicate. One of the chief defects in the ordinary earthenware is the manner in which the bottoms of most of the *chatties* are finished off. The neck and upper part are first completed on the wheel; then the lower portion is cut off; and after partially drying in the sun, the bottom is reconstructed by tapping and drawing out with a wooden mallet and a round stone, the thick edges of the upper part of the vessel, until the orifice is closed. This is, no doubt, done with the object of toughening the bottom of large vessels intended to contain water; but the process is long and tedious, and the potter is not able to complete more than eight or nine *chatties* in a day.

The usual manner in which most of the Madras potters bake their wares is as follows:—A circular space about 10 feet in diameter is marked out on the ground in any convenient open spot. Small pieces of wood and dried sticks are spread over this space to a depth of about 6 inches, and a layer of "*bratties*," or dried cow-dung cakes, laid over the sticks. The vessels are then carefully piled on top of this platform of fuel to a height of about 5 or 6 feet, and the whole heap is covered over with straw and plastered over with clay, a few small openings being left here and there to allow the smoke to escape. These arrangements being completed, the fuel at the bottom is fired, and in the course of a few hours the process of baking is completed. At the Madras School of Arts, the Government Brickfields, and other manufactories where pottery of a superior quality is manufactured, regular kilns are used, constructed after the pattern of English and American furnaces; so also as regards the other tools and appliances. And the native potters who have had the advantage of seeing these, have effected some improvement in their own methods.

LIST OF ILLUSTRATIONS.

60 to 62.—Antique pottery from old tombs. 63.—Facsimile of two pages from an old number of *The Indian Journal of Art, Science and Manufacture*, published in 1856. 64.—Antique pottery from old tombs. 65.—Modern Madras earthenware. 66.—Earthenware from South Canara. 67.—The native potter's wheel. 68.—Rotating the wheel. 69.—Madras potters at work. 70.—Collection of Arcot and Burmese pottery. 71.—Madras School of Arts' pottery. 72.—Flower pots, Madras School of Arts. 73.—Madras School of Arts' pottery. 74.—Modellers at work, Government Brickfields. 75.—Terra-cotta ornaments executed at the Government Brickfields.

60.—Antique Pottery from Old Tombs.



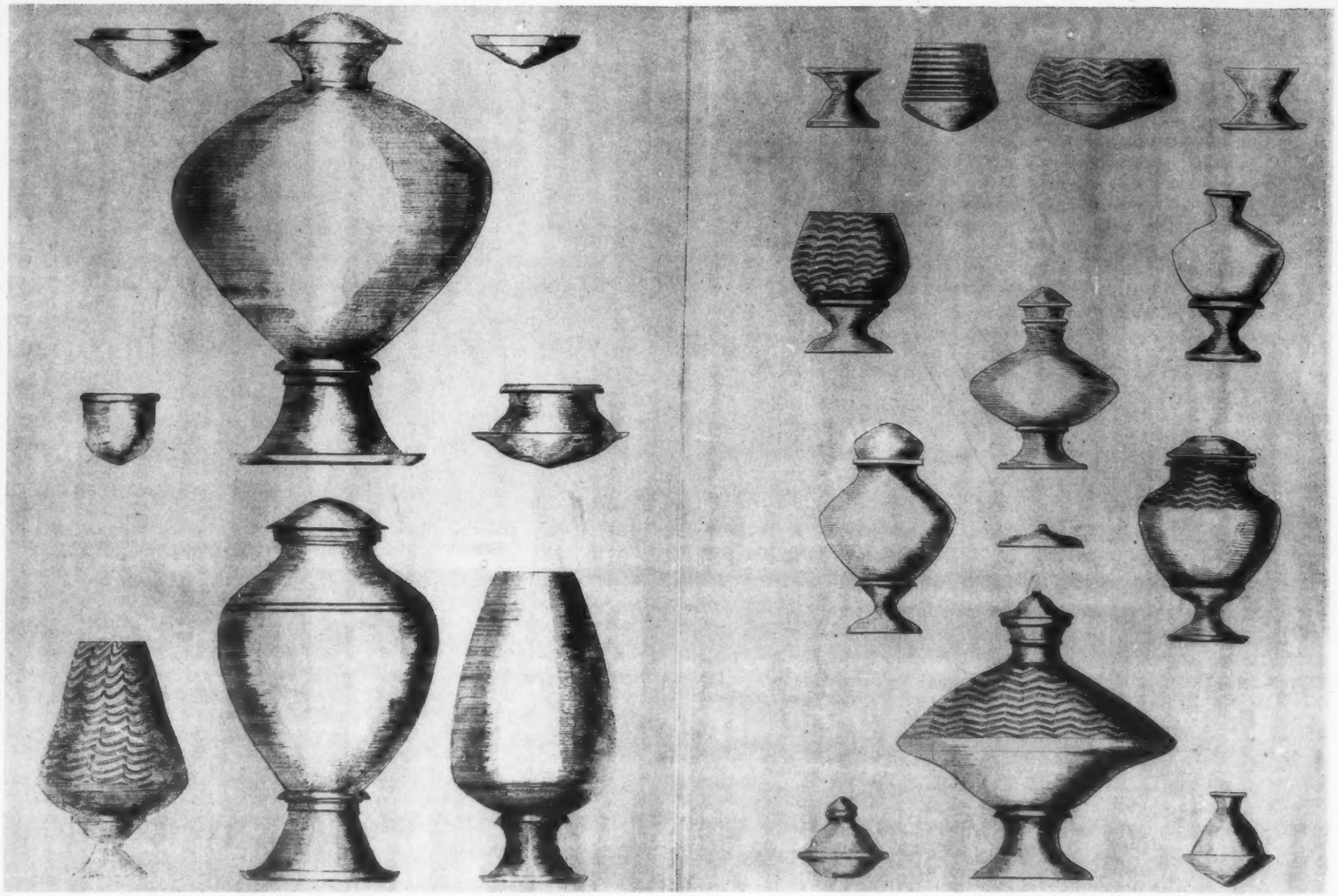
61.—Antique Pottery from Old Tombs.

Drawn by C. Gangadaren, Madras School of Arts. *Scale about ¼.*

Drawn by P. Krishnaswamy, Madras School of Arts.

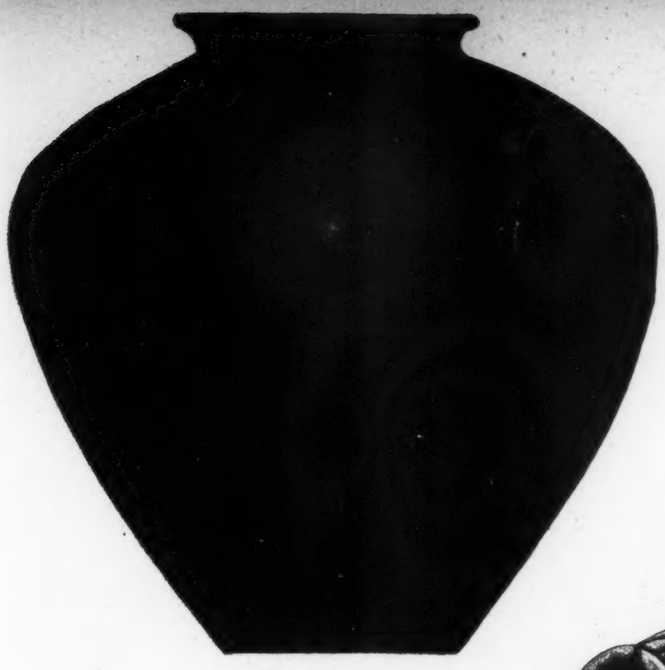
62.—Antique Pottery from Old Tombs.

K. Subbaiyar, pinxt., Madras School of Arts.



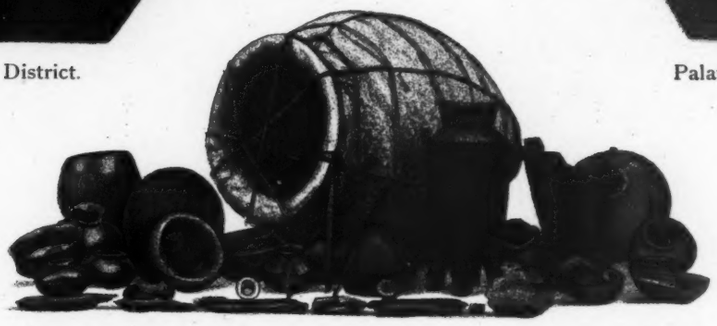
63.—Antique Pottery from Tombs at Coimbatore.

Facsimile of two pages from an old number of the "Indian Journal of Art, Science and Manufacture," published in 1856.



Malabar District.

Palavaram.



Found by T. R. Sandford, Esq. Coimbatore District. *From a photograph by E. W. Stoney, Esq.*

Coimbatore District.

Chingleput District.

64.—ANTIQUE POTTERY FROM OLD TOMBS.

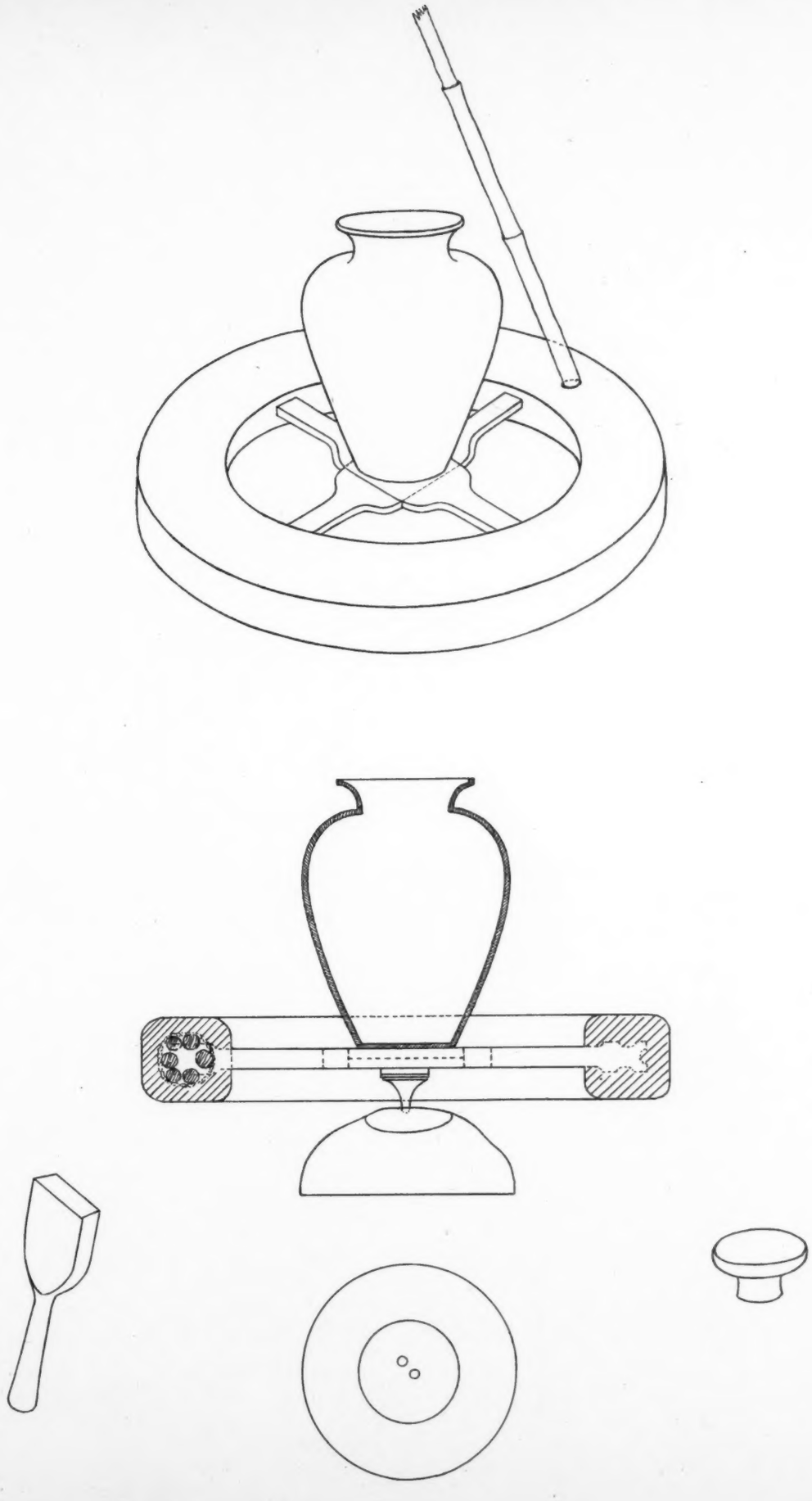
Drawn by P. Krishnaswamy, Madras School of Arts.

65.—Modern Madras Earthenware.

From a photograph by Messrs. Wiele & Klein, Madras.

66.—Earthenware from South Canara.

Drawn by P. Krishnaswamy, Madras School of Arts.



67.—The Native Potter's Wheel.

Drawn by P. Krishnaswamy, Madras School of Arts.

68.—Rotating the Wheel.

From a photograph by Messrs. Wiele & Klein, Madras.

69.—MADRAS POTTERS AT WORK.

From a photograph by Messrs. Wiele & Klein, Madras.

70.—Collection of Arcot and Burmese Pottery.

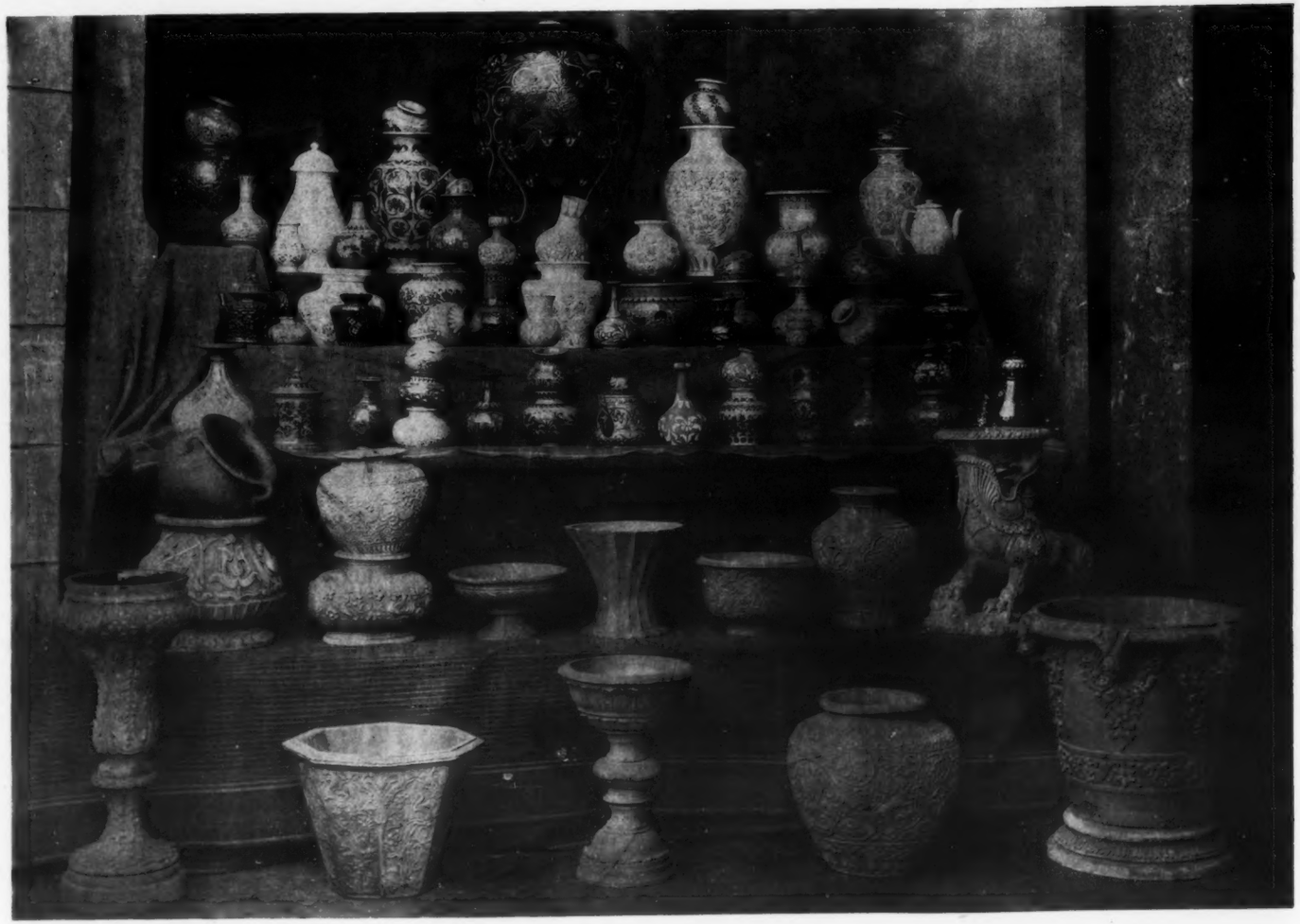
From a photograph by H. A. Wilkins, Madras School of Arts.

71.—MADRAS SCHOOL OF ARTS' POTTERY.

K. Subbaiyar, pinxt., Madras School of Arts.

72.—Flower Pots, Madras School of Arts.

From a photograph by H. A. Wilkins, Madras School of Arts.



73.—MADRAS SCHOOL OF ARTS' POTTERY.

From a photograph by Messrs. Wiele & Klein, Madras.

74.—MODELLERS AT WORK. GOVERNMENT BRICKFIELDS.

From a photograph by Messrs. Wiele & Klein, Madras.

75.—Terra-Cotta Ornaments executed at the Government Brickfields.

From a photograph by Messrs. Wiele & Klein, Madras.

The Journal of Indian Art and Industry.

DYES AND DYEING IN BENGAL.

By N. N. BANERJEI, B.A., M.R.A.C., Assistant Director of Land Records and Agriculture, Bengal.

GENERAL REMARKS.

Dyeing.—The art of dyeing has long been practised in India, a country which furnishes raw materials for producing a great variety of colours; but whatever degree of perfection dyeing may have attained in past times, at the present day it does not occupy a very prominent place in the list of industries of this country. The importation of cheap European goods and European aniline dyes is proving fatal to the indigenous dyeing industry of these Provinces. This industry used to be carried on at one time on a large scale by silk and cotton-weavers, but their number has sensibly declined during the last few years, and they have been obliged to give up weaving and dyeing for other professions. European dyes, which are not as fast as indigenous dyes, appear to commend themselves to the people of this country on account of their cheapness and their brilliancy of colour. The ease with which they can be used makes them also more popular. These causes have tended to undermine the trade of the professional dyers. Whereas formerly, when a person wanted to wear a coloured cloth, he was compelled to go to the dyer, who alone knew the complicated processes by which colours could be produced from the indigenous products of this country, he now mixes up European chemical powders himself, and simply dips his cloth into a solution of the powders, when a coloured garment is ready for his use. There are other causes also which are connected with the low condition of the native industry. There appears to be a want of ingenuity in the production of colours and designs among the people of these Provinces. There is no attempt on the part of native dyers to change their crude processes, and the result is, that European cloths of various patterns and designs find a readier sale in the market. The want of capital also is a stumbling-block to improvement of any kind. Dyeing at the present day can at best be said to afford occupation only to a few who, with the aid of indigenous or foreign dyes, are capable of supplying the requirements of those who, through their social status or other circumstance, have retained their preferences for country cloth and country dyeing. In support of the views put forth above, it may be mentioned that silk-dyeing has all but died away in most of the silk districts. In Bankura, Midnapore, Rajshahi, Bogra, Bhagalpur, Malda, and even in Murshidabad, the dyeing industry, which once flourished in these places, is now in quite a moribund condition owing to the decline in the silk industry itself.

Similarly, almost every district shows a falling-off in cotton-dyeing. The *saris* made in Chandrakona and its neighbourhood in Midnapore still command a sale in the market, but being of very light material, they are not worn by decent women, although their colours are very effectively arranged. There is also a demand still for Santipur embroidered cloth made by the weavers of the Nadia district, but here also imported dyes are chiefly used. Carpet-weaving and dyeing has also declined. At one time, it used to be a flourishing industry in Rangpur, Patna, Gaya, and Muzaffarpur. At present, there are but a few families who prepare coloured threads for weaving carpets. The only place where carpet-weaving and dyeing is now carried on to any extent is the Sultanganj *mohulla* of the Patna City, where, according to Mr. Collin's Report on the Industries of Bengal, the annual outturn of coloured carpets is valued at half a lakh. The dyeing of wool is carried on only to a nominal extent now, and is mostly confined to the Bhagalpur and Patna divisions. In the Bhagalpur jail, it forms an important item of work for prisoners. Dyeing of other articles, such as wood, *sola* (pith), &c., is not confined to any particular district, but the industry is so insignificant that there is very little to add here on the subject.

Lac bangles are still made in small quantities all over the country, and lac toys are still manufactured and dyed by indigenous processes at Ilambazar in the Birbhum district; but there is no very great demand for the articles made. A good number of dyeing shops are to be seen in Calcutta, especially in the neighbourhood of Muhammadan *bustees* and houses of ill-fame, the chief shops being located in Colootollah, Machuabazar, and Colinga. The above remarks have been made with reference to plain dyeing, but they are more or less applicable also to colour-printing, which is done by a class of men known as *Chipigars*. On the whole, very little printing is now done in Bengal. There are a few up-country printers in Calcutta and in Howrah. Besides these two places, printing is now reported to be carried on to some extent in Hooghly, Rajshahi, Pabna, Gaya, Muzaffarpur, Darbhanga, and Monghyr

DISTRIBUTION of the DYEING AND PRINTING INDUSTRY OVER THESE PROVINCES.

Owing to the fragmentary nature of the information contained in district reports regarding the classes who carry on the dyeing industry, it has not been found possible to give any accurate totals for the Province in this monograph. The following, which has been taken from the Census Report of 1891, shows the number of cotton dyers in each division of these Provinces:—Burdwan, 399; Presidency, 480; Rajshahi, 49; Dacca, 10; Chittagong, 58; Patna, 18284; Bhagalpur, 1,106; Orissa, 28; Chota Nagpur, 372. The total number (20,786) includes both males and females, but it must be remembered that, with some exceptions, adult males alone engage in dyeing.

The above does not give a full survey of the total number of dyers in these Provinces, as, besides cotton-dyeing, there exists the silk-dyeing industry, and the dyeing of other materials besides cloth, such as wood, *sola* (pith), &c. In many districts, also, the work of dyeing forms but an incidental portion of the work of weavers

and other castes, and any estimate of the number of dyers should take this fact into consideration. The Census Report is also silent as to the numerical strength of each caste engaged in dyeing, and it, moreover, at best gives a picture of the dyeing industry as it stood six years ago. Since then, owing to the every-day increasing use of aniline dyes, the native industry has gradually declined.

Some idea of the relative importance of the dyeing industry in the different districts of these Provinces at the present day may be gathered from the following information extracted from the reports of District Officers. The chief centres of the industry in different districts are stated where known. The information of District Officers has been supplemented with information obtained personally by the writer.

Dyeing is carried on on a small scale in the villages of the Sadar subdivision of Burdwan. In the Sadar town itself, there are only three or four shops with about a dozen workmen. In the Raniganj and Kalna subdivisions, it is reported that dyes are not manufactured, and that no dyeing processes are carried on. In Katwa, lac dye was once largely manufactured and used for dyeing in Dignagar and Hatkirtinagar, but it is now found profitable to prepare shellac in these places. Conch-shell ornaments and *tasar* cloth are also dyed in Katwa. The numbers who engage in this work are very limited. Altogether, the dyeing industry in the district is said to be in a moribund condition. Only a few dyers exist at the present day, who are scattered over different parts of the district.

No dyeing is carried on in the Birbhum district. Indigo is prepared in nominal quantities in two small factories, and lac is obtained all over the district in small quantities, and used for the manufacture of bracelets and other ornaments.

The dyeing industry is for the most part confined to the cotton and silk-weavers of the Bankura district. They were at one time numerous, but owing to the importation of European piece-goods and aniline dyes, many of them have taken to menial labour, and there are at present reported to be only about 500 or 600 families of weavers at Vishnupur and Sonamuki, and about 200 to 300 families in Bankura town and in the villages of Rajgram and Birsingpur, who, too, are said to have almost given up dyeing cotton and silk with indigenous dyes.

The report from Midnapore states, that here and there dyes are occasionally made, but that the manufacture nowhere amounts to an industry, although several plants and trees grow in the district, from which dyes can be obtained. Dyeing was most probably extensively carried on when the silk industry flourished.

Dyes are manufactured and used in the Hooghly district on a limited scale. The indigenous substances from which they are prepared are not produced in the district, but brought from the neighbouring districts of Bankura and Midnapore and from Calcutta. There are about 400 to 500 Laharis (*i.e.*, lac dealers) in the district, who chiefly reside in the Sadar and Jahanabad subdivisions. There are also about 700 to 800 weavers scattered over the district, who engage in dyeing silk and cotton. Besides this, there are three firms in Serampore, where silk handkerchiefs and cloths of good repute are dyed and sent to Calcutta, whence they are despatched to Bombay, Rangoon, Madras, and England. Colour printing is done in these shops. In Howrah, there are about 25 dyers scattered over the town, and a few families of printers.

Beyond four or five families who prepare a red dye on the occasion of the Holi festival, it is reported that there is no class of people who carry on dyeing in the 24 Parganas. The process of dyeing by indigenous methods is confined only to a few people in the Nadia district. Weavers in Santipur and Kushtia use imported dyes.

There are about nine families of silk dyers in Murshidabad, whose centres of business are at Khagra, Baluchar, and Mirzapur. These men are weavers by caste. Each dyer employs about six or seven workmen under him. Besides these there are three families of Muhammadans, who also dye cotton cloths, especially quilts, which are exported to Calcutta, Dacca, and other places, and two families of toy makers, who dye wooden wares.

It is reported, that no dyes are manufactured and that no system of dyeing is carried on in Jessore and Khulna on any scale. There are only four persons in Rajshahi who print cotton cloths, and six who dye them, whose shops are all in the Sadar town. About 30 carpenters dye wooden articles in the Putia, Nator, and Boalia thanas, and about 506 Muchis and half that number of Chamars dye leather throughout the district. About 800 persons of the Malakar and Bairagi castes are reported to dye pith articles chiefly in the towns of Rampur, Boalia and Putia, and about 18 families of Doms are reported to dye bamboo and cane wares. The Kumars of the district, who numbered 7,945 according to the Census of 1891, all dye their earthen pots.

No indigenous dyeing industry is reported to exist in Dinajpur. In Jalpaiguri, no particular class carry on dyeing. The Tantis, Muhammadans, and Meches of the district dye the *endi* thread for their own use chiefly, and rarely only for sale. No information is forthcoming as to the number of dyers in Darjeeling. It would appear, however, that dyeing is a very unimportant industry of the district. Nine persons in the village of Nesbitganj, three miles to the west of Rangpur town, are reported to dye thread for weaving carpets, and about 500 persons scattered about in various villages are said to be engaged in dyeing *endi* cloth.

Dyeing is carried on to a small extent by the silk and cloth-weavers of the Bogra district. Of the former, there are said to be at present only about half a dozen skilful workers. The number of the latter is estimated at 200. There are about 16 shops of dyers in the Pabna district. The total number of men engaged in dyeing is estimated at 200 to 300. The centre of the industry is at Pabna town, where there are 11 shops.

In Cox's Bazar subdivision, in the Chittagong district, dyeing is carried on among the Mughs who live in that subdivision. In Cox's Bazar Municipality itself, there are about 180 houses of Mughs, whose productions are noted for the brightness and fastness of their colour. The chief centre of the industry is in a village called Tekpara. In this village, indigo is also used for dyeing by Mussalman women in 10 or 11 houses; in Ramu and Harbhang the wives and widows of labourers and traders dye to a small extent. There are about 40 families of weavers in Pahartali village who also dye. In Chittagong town itself, there are only about two or three houses of dyers. Printing is done by a few boys.

At Patna, the number of cotton dyers in the Sadar town is estimated at 100, and that in the rest of the district at 100 also. About 500 men are said to be engaged in stamping cloths in different fancy colours. Besides these,

there are about 500 families of weavers in Futwa in the Barh subdivision who dye their own cotton and silk threads before weaving. There are also a number of weavers who dye raw cotton and thread for the purpose of preparing *daris* (carpets). It is estimated that there are 143 dyers at the Sadar subdivision of Gaya, 38 in Nawada, 46 in Jahanabad, and 65 in Aurangabad; altogether 292 in number. Some of these are really *chapgars* or stampers, whose real business is to stamp shades of various colours on cloths already dyed. At Shahabad, the number of persons actually engaged in the dyeing industry is comparatively small. The centres of the higher forms of the industry are Sasaram for dyeing earthenware or plates, and Arrah for dyeing wood and cloth.

There are about 300 dyers in the district of Saran. The chief centres of the industry are the towns of Chapra and Siwan. The number of cloth and thread dyers in the Champaran district is about 900, including females. They are scattered throughout the district, but principally carry on the trade in the towns of Bettiah and Motihari. Threads are dyed also for making carpets by carpet weavers, whose number is about 250, inclusive of females. There are 30 to 35 dyers in the town of Muzaffarpur, and 5 to 7 in that of Hajipur, while every other important village in the district has its own dyers. In Muzaffarpur, calico printing is also carried on. In Darbhanga, the number of dyers is not considerable. They may be broadly divided into two classes, viz. (1) the general dyers, and (2) the printers.

Dyeing is now a limited industry in Monghyr, the dyers of the district numbering only about 150. Besides the dyers, there are about 40 or 50 calico printers in the district, the chief centre of whose industry is the town of Shaikpura. Formerly, when *tasar* silk-weaving flourished in Bhagalpur, dyeing gave employment to a large number of persons; now it is carried on only to a very limited extent in the district.

There are about a dozen families of professional dyers in the Malda district. Besides this, there are a few families of silk-weavers who colour their own silk. Dyeing among the Sonthals is purely a village industry carried on here and there in the district. Besides them, the Jogis manufacture rude dyes. According to the last census, they number 1,500 males and females. It is only in the outlying portions of the Cuttack district that dyeing is practised to any extent. In all the principal centres, the cheaper and brighter tinted yarn from Europe has superseded the local industry. Dyeing is reported to be carried on in 20 families in each of the 52 villages of Talda thana; and in Barabazar, it is estimated that there are about 1,000 cultivators who take more or less to dyeing. The silk-weavers of the district also dye to some extent.

From the above, it will appear that the chief centre of the dyeing industry is Bihar. The Patna division of Bihar, and especially the district of Patna, has the largest number of dyeing shops. In Central Bengal, though the industry has declined, indigenous modes of dyeing are still practised to some extent. Dyeing appears to be virtually extinct in Northern and Eastern Bengal and in Orissa. In Chota Nagpur it is carried on only to a small extent. Silk-dyeing still prevails in Murshidabad, and to a limited extent in Bankura, Bogra, and Malda. It has all but died out in other silk districts, such as Midnapore, Rajshahi, and Bhagalpur. Printing is chiefly carried on in the Patna division of Bihar. Dyeing and printing is also carried on in Calcutta, but aniline dyes are almost universally used here, the indigenous dyes being employed only when specially ordered.

DYERS AND PRINTERS, THEIR SOCIAL AND PROFESSIONAL STATUS.

The Muhammadans are the principal dyers of these Provinces. Among the Hindus, the Tantis are the principal dyers. The other classes who once engaged or now engage in dyeing are reported to be Kumars (potters), Kamars (carpenters), Sadgopes, Sarnobarniks, Bairagis, Rajbanghis, Jogis, Rishis, Muchis, Chamars, Kandus, Dhobis, Tatwas, Malis, Paurs (weavers), Patras, Sonthals, Kols, Kurmis, Bhumijes, Baidyas, Chatrars, Doms, Mughs and Meches.

Dyers go under different designations according to the districts in which they carry on their work, and according to the branch of the industry in which they engage. In Bihar, those who dye cloths are called *rangrezes;* those who dye silks *patuns*, and the lac-dyers are known as *laheras*. In Lower Bengal, lac-dyers are styled *laharas*, and in Orissa the silk-dyers are known as *patras*. In Shahabad, those who dye wooden plates and boxes are styled *kamangars;* those who dye and enamel woodwork, *barahais;* and those who paint *tikulis* (worn by village women on their foreheads), *nuniars*. Those who dye wood are also called *rangsazes* in Bihar. In Murshidabad, the dyers of wooden toys are known as *kharadis*. Those who dye conch-shell ornaments are called *shankaris*, and those who paint *churis* are known as *nuris*. Those who paint *sola* (pith) toys and idols are called *malakars;* calico and silk printers are styled *chapgars* or *chipigars*.

Generally, professional dyeing is done by males. Women may also dye, but they do so as a rule for their own use at their houses, and do not work in shops. In Chittagong, however, Mugh and Musalman women are reported to carry on dyeing. Boys may be found sometimes working as apprentices in the shops of their relatives.

It may be interesting here to remark, that outside professional dyeing both males and females use dyes on different occasions for colouring. It is a general practice with the poorer class of Brahmans of Bengal to dye the clothes of their sons during the ceremony of donning the sacred thread (*poita*). The well-to-do Brahmans who can afford to buy coloured silken cloths (*chelis*) do not take this trouble. At the time of the *Charakpuja* in Bengal, the Hindus who do penance, whether men or women, always dye the coloured clothes they then wear with their own hands. These include all classes of Hindus, except Brahmans. Women of all classes, both Hindus and Muhammadans, decorate their feet and the palms of their hands with a red colour obtained from lac. Married women paint their foreheads at the parting of their hair with an indigenous vermillion dye. Women of all classes, especially Muhammadan women, obtain a red dye from the *mehndi* (*Lawsonia Alba*) with which they colour their fingers, nails, hands and feet. *Mehndi* is also used for dyeing the beard or hair among the Muhammadans. Turmeric dye is rubbed over the body by all classes, and the *abir* is used by the Hindus at the time of the *Holi* festival.

The Muhammadans are the principal dyers and printers in Bihar. They are also to be found in other districts in Bengal. As a rule, they belong to the Sheikh sect. Contradictory reports have been received with

regard to their social standing. While from some districts it is reported that dyeing is not considered derogatory, and that the Muhammadans who practise this art are not looked down upon by their fellow-countrymen, from other districts it is reported that the Muhammadan dyers occupy a low social standing among their brethren. My personal enquiries in this matter incline to the former view. Though a Sheikh of some other profession would not intermarry with a Sheikh dyer, it is not to be inferred that the latter is of lower social rank. The dyers have their own restrictions as to marriage, but in other respects they mix freely and equally with all Sheikhs. The Muhammadans for the most part engage in dyeing cotton, silk, cloth or thread. In Rajshahi, a few families dye articles made of *sola* (pith); and in Shahabad, in addition to cloth, they dye wood and deal also in lac-dyes.

The Tantis belong to the weaver caste. They are to be found in almost every district of Bengal, where, to their own profession, they sometimes add the work of dyeing. They are generally very poor, and belong to a low order of Hindu society. Their work is chiefly confined to dyeing cloths and threads.

The Kumars belong to the potter caste, and occupy a place below the Kayasths. They are not professional dyers, but simply colour the earthen pots manufactured by them. Men and women both engage in this work. Some few families in Rajshahi are said to paint toys and idols with native colours.

The Kamars are of the carpenter caste, and although dyeing does not come within their regular profession, some of them do dye their wooden wares. In Shahabad, these Kamars, or Barahais as they are sometimes called, dye and enamel wood-work.

The Satgopes and Sarnobarniks are reported to have at one time carried on the manufacture of lac-dye in Burdwan. The Bairagis profess a religious life, occupying a low social position among the Hindus. They are not allowed to eat with higher castes. In Rajshahi, they are found painting toys made of *sola* (pith), and in this work men and women alike take part.

There is a limited number of Rajbangshis in Rangpur, who are said to dye *endi* thread and *endi* cloth for home use and for their neighbours, and not generally for sale. There are a few Jogis also in Rangpur who dye cloth, like the Rajbangshis. In the Sonthal Parganas, also, Jogis carry on the dyeing industry. These men do not depend entirely on dyeing for their livelihood. They are cultivators, and in times of scarcity take to begging. Rishis are low-caste Hindu butchers, who are said to dye leather in Faridpur. Their number is very limited. Muchis and Chamars also carry on this work. They are of a very low caste, just a little above the Doms in social position. Leather is dyed in Faridpur and other places by low-class Muhammadans also.

Kandus, Dhobis, Tatwas and Malis are said to dye with the *al* dye in Patna. Dhobis are generally calico printers. The Paurs in Lohardaga (corresponding to the Tantis of Lower Bengal) dye their own yarn before weaving cloth. Like the Tantis, they hold a low place in Hindu society. Patras are the silk-dyers of Orissa. Sonthals are reported to engage in dyeing in Bhagalpur, Sonthal Parganas, and Manbhum. They chiefly engage in dyeing cloth and yarn. In Manbhum, only Kols, Kurmis, Baidyas, and Chatrars are reported to carry on dyeing operations.

Domes belong to the lowest caste of Hindus, whose touch is pollution to other Hindus. They generally dye articles made of split bamboo or cane. Mughs are reported to carry on their dyeing work in two districts, viz., Backergunge and Chittagong. They appear to be of Arakanese origin, and make good dyers. In Chittagong, it is reported that dyeing forms part of almost every young Mugh woman's education. They are well noted for dyeing bright colours in the pattern of plaids on silk and cotton cloths. Meches belong to an aboriginal race. They are mentioned in the reports from Jalpaiguri as a class who dye their own cloths. Besides the above, a few Kahars, Telis, Marwaris and Kayasths also engage in dyeing.

Dyers as a class are very poor. They dye for local use only. Their ordinary earnings do not exceed Rs. 8 per month, and in order to maintain their families they have to take service and ply various trades, carrying on dyeing only as a part of their work. Some have their own lands to cultivate, and as a rule these are in better circumstances. The poorest class of dyers do not earn more than Rs. 3 to Rs. 5 per month, but there are others also who earn as much as Rs. 12 to Rs. 15 per month. Owing to the greater demand for their work, dyers in Calcutta, as a rule, are better off than their brethren in the interior. Exceptional cases may be found of rich dyers in the mufassal, who have a large number of subordinates working under them, and who get more than the earnings quoted above; *e.g.*, in Patna there are some dyers who earn as much as Rs. 50 per month; in Gaya one rich dyer is said to earn an income of about Rs. 900 a year, and two or three others earn about Rs. 300 to Rs. 500 a year. All these remarks apply to cotton dyers. The poorest class among the dyers, if they be so considered, are the Doms, who colour baskets and other bamboo articles. Their earnings do not exceed Rs. 3 to Rs. 5 per month. The Chamars, who dye leather, are better off, earning from about Rs. 7 to Rs. 15 per mensem. Potters, who dye their earthen pots, are generally well off, owing to the great demand for such vessels among all classes of Hindus. Dyeing carpenters (or *Rangsazes*) also are, as a rule, in good circumstances, and earn from Rs. 10 to Rs. 20 per mensem. Silk-dyers, as a class, are in better circumstances than those who dye cotton. Their ordinary earnings vary from Rs. 10 to Rs. 12 per month. Rich silk-dyers are to be met with, who employ subordinate workmen to carry on their work. There are said to be about nine families of such dyers in Murshidabad, whose net profits average about Rs. 500 a year. The business of silk-dyers depends generally upon the conditions of the silk trade of the districts in which they have their shops.

Like dyers, calico printers do not ordinarily earn more than Rs. 6 to Rs. 8 per month. At the Serampore printing shops, the proprietors are said to earn from Rs. 20 to Rs. 25 per mensem. The experts employed by them earn from Rs. 10 to Rs. 15 a month, and the boys under the pressman get Rs. 5 per month. In Calcutta, the ordinary earnings of a printer amount to about Rs. 15 per month.

DYE-STUFFS AND PROCESSES EMPLOYED IN DYEING.

PRINCIPAL DYE-STUFFS.—The substances used in dyeing and printing include the fruits, flowers, leaves, roots, seed, bark, wood and galls of plants, and also insects and earths.

The chief indigenous products of these Provinces yielding dye-stuffs and now used by dyers are :—Indigo (*Indigofera tinctoria*), turmeric (*Curcuma longa*), lac, *kusum* (*Carthamus tinctorius*), *bakam* (*Cæsalpinia Sappan*), *singhar* (*Nyctanthes Arbortristis*), *kamala* (*Mallotus Philippinensis*), *palas* (*Butea frondosa*), *latkan* (*Bixa orellana*), and *al* (*Morinda tinctoria*). All the above generally yield principal dyes, but they are also sometimes used as auxiliaries. Keeping in view the instructions of the Government of India, that products and materials are to be discussed in this report, only in so far as they are needful for the purpose of giving a survey of the indigenous industry, a short description is added only of the more important dyes mentioned above, and the ordinary processes employed in extracting and using them.

Indigo is used very largely for dyeing, but the dye is generally manufactured by European processes, of which so much is already known that no elaborate description is necessary in this report. Suffice it to say, that the indigo manufactured by the European process is not a permanent dye, and it is therefore sometimes mixed by native dyers with some other ingredients, *e.g.*, shell-lime, *sajimati*, treacle, and the pounded roots of the *auch* or *al* tree (*Morinda tinctoria*), as reported from Faridpur, in order to make the colour permanent. Indigo, however, is prepared on the indigenous process by native dyers in Chittagong, and is said to be cheaper than imported dyes. Moreover, it is not found necessary to use lime with it in colouring, probably due to the fact that lime is used in its manufacture. No description is given in the district reports received of the indigenous method of preparing the indigo dye; but the following accounts, extracted from Dr. McCann's Report on the Dyes of Bengal, may prove interesting.

He states that in Chittagong, "the plants on being gathered are allowed to rot in water and then removed. The water is then mixed with lime, and the liquid allowed to stand for about 12 hours. At the end of this time, a deposit is found at the bottom of the vessel, which is dried and kept in the form of cakes." "In Palamau," he says, "the plants are soaked in a large open earthen vessel. The water is beaten up, and then put on the fire in small vessels to boil. When this has been done sufficiently, the dye is strained through country-cloth."

Lac is found as an incrustation on the branches of various trees, being formed by an insect known as the *Coccus Lacca*. The trees on which it is chiefly found are the *pipal* or *aswat* (*Ficus religiosa*), the plum tree (*Zizyphus Jujuba*), the *palas* (*Butea frondosa*), and the *kusum* tree (*Schleichera Trijuga*). The best lac is said to be produced on the last two trees. It is reported to be produced in Birbhum, Bankura, Midnapore, Murshidabad, Manbhum, and Singhbhum, but its manufacture does not appear to be carried on now at Bankura and Birbhum. Lac is found mostly on trees growing wild. Very few trees are now specially cultivated for its production. In Murshidabad, however, a large tract of land, lying on the right bank of the river Bhagirathi, known as the *rarh* tract of the district, is laid out with lac-producing plum trees. Each tree is said to yield from 10 to 20 seers of lac. The cost of production varies from one rupee to two rupees per tree, or Rs.80 to Rs.160 per bigha, which contains about 80 plum trees. The trade in lac is now very limited. The only districts from which it appears to be exported are Bankura, Murshidabad, and Manbhum. The incrustation in its natural state is known as stick-lac. This is taken off the trees in March and October by pounding, so that the resin is separated from the twigs. The resin is then ground into a fine powder, and well rubbed in cold water for some time. To promote the separation of the dye from the resin, water is added at intervals, and an alkali (*sajimati*) is sometimes mixed with the resinous powder under water. The liquid is then strained through a coarse cloth; the resin is left behind, and is utilized for the purpose of making shellac. The liquid strained is allowed to settle in a vessel for some time, until a thick sediment forms at the bottom. A little lime-water is added to help the precipitation of the sediment. This sediment is then pressed into cakes, and forms the lac-dye of commerce. From this is prepared another article which is used as a cosmetic, called *alta*. The first step taken by the *alta* makers is to pound the lac into a coarse powder. This powder is then placed in a large earthen vessel, which is usually made with a rough inner surface. Some water is then added, and the whole is stirred vigorously with a thick stick. Water is added a second time, and the liquid is heated and left to simmer for some time with a little alum added to it. After this, the contents are allowed to cool and are then strained. The liquid thus strained off is of a rich crimson colour. Then some cotton is taken and soaked in a kind of starch made from pulse, and beaten out into a thin circular slab. These slabs or pieces are then placed in the crimson liquid and allowed to become thoroughly saturated, when they are taken out and dried, and are then ready for sale. Eight to twelve such pieces may be had for a pice.

Lac is used for the manufacture of toys, of bracelets, and other ornaments by Laharis. Country lamps, which are so largely used by the natives, generally have a crimson band round the chimney, which is produced from lac. Lac is further used by toy-makers (*kharadis*) for the purpose of coating their wooden wares. Earthen toys and idols are also coated with lac. Weavers use it for dyeing silk, and especially *tasar* silk materials.

Like indigo, turmeric is extensively employed in dyeing cotton clothes, especially at weddings and on other festive occasions. In many districts, householders will be found dyeing their bathing napkins in turmeric. In Orissa, almost every householder dyes the clothes of his children or of the females of the house with this material. It is used also for dyeing toys and other articles of *sola* (pith). Turmeric yields a colour of a fleeting character only, and is used generally as an auxiliary to other dye-stuffs. It is also rubbed on the body in order to give a yellow flush to the skin. The process by which the dye is extracted is very simple. The dry root or rhizome is soaked in water, and then pounded and placed on a piece of coarse cloth. Water is then added and strained through the cloth. From Muzaffarpur, it is reported that one seer of turmeric with two seers of water gives the necessary infusion. In upper circles of Indian society, saffron is generally used instead of turmeric in dyeing clothes yellow.

Safflower is much appreciated on account of the many simple and compound colours that it produces. In itself, it contains two pigment principles, viz., safflower yellow and safflower red. It is largely used all over these Provinces, and especially in Bihar; and in spite of the introduction of aniline dyes, it has not been driven out of the market. Indeed, in Bihar, it is regarded as particularly sacred by the Hindus—a fact which is exemplified by

the current Bihari aphorism, "*Bap rahal pet me, put gal bariyat*" (*i.e.*, "When the father is in the womb, the son goes to the wedding party.") The father is the seed, and the son is the dye. The red colour of safflower, being considered as an emblem of holiness and success by orthodox Hindus, is much used for wedding apparels. The Dacca safflower is the best in India. Desides being used for dyeing cloth of cotton or silk, safflower is also used for colouring toys, &c., made of *sola* (pith).

The methods of extracting the dye employed in the various districts of these Provinces are in all essentials similar. It will suffice, therefore, to add the following description of the method employed at Muzaffarpur, which is supported by what the writer has himself observed:—"The florets, after collection, are placed in a basket and dried in the shade. Exposure to the sun weakens the dye. When the florets are sufficiently dry, they are deposited in an earthen jar. About $\frac{1}{4}$ lb. of these florets are mixed with about two seers of cold water, after being ground to a coarse powder. The powder is then washed by being rubbed with the hand, and then it is agitated briskly for about 15 minutes or so. The water, which is of a dirty yellow colour, is then decanted. Fresh cold water is again added, and the whole mixture put into a piece of cloth hung on a wooden filter frame. The water is allowed to filter down gradually. This process may be repeated several times until the yellow tint is almost removed. The yellow water thus obtained, known as *pewar* in Bihar, is sometimes thrown away, and sometimes kept for preparing more complicated dyes. When the yellow principle is thus eliminated, some alkaline substance is added to the flowers in order to dissolve the red colouring matter. One-and-a-quarter *tolas* of *sajimati* suffice for the purpose. The mixture is then well pounded together. This is done either by rubbing with the hand or treading with the feet. To the above compound is then added $1\frac{1}{2}$ lbs. of cold water, and when the alkali has been sufficiently mixed with the flowers, the water is allowed to strain through. The resulting solution is now of a red colour." A little lime-juice is sometimes added to neutralize the effects of *sajimati*. Wood ashes, and ashes of burnt plantain rinds, and pods of palm flowers are in some cases substituted for *sajimati*. Sometimes, again, tamarind, mango, or curdled milk is used instead of lime-juice.

The *bakam* plant, from the wood of which is obtained a red dye, is said to grow abundantly in Cuttack. In Faridpur, the *bakam* dye was at one time largely used, but has been superseded now by majenta and other aniline dyes. The bark of the plant is used for producing an orange-yellow-coloured dye in Muzaffarpur. The wood is never used here for dyeing purposes, The oldest and biggest trees are said to yield the best dyes. The bark is also used in Chittagong for getting a *pucka* or fast red colour. Besides being used for cloth, *bakam* is also used for the preparation of *abir*, a red powder which is used during the Holi or Doljatra festival.

The mode of preparing it is thus described in the report received from the 24 Parganas:—"The roots of the *soonti* plant are dried and then powdered, and then mixed with the extract obtained from *bakam* wood." From Cuttack it is reported that *abir* is made by pounding the roots of the *palua* (*Banhuldi—Curcuma Zedoaria*) fine, and then steeping the powder in an infusion of *bakam* wood. The powder is then dried and again steeped, and the process repeated until the desired shade is obtained. The powder is then well dried, and is ready for sale. It is stated in the Cuttack report, that imported English dyes have taken the place of *bakam*, even in the manufacture of *abir*. The *bakam* dye itself is extracted simply by cutting up the wood in small pieces, or pounding it into a powder, and then boiling it for five to eight hours. The proportion of wood to water, as stated in the Monghyr report, is 4 chitaks *bakam* to 4 seers of water.

The trees which bear the *singhar* flower are not generally planted. They are found growing wild in gardens and homesteads almost in all districts of these Provinces, and are reported to grow to perfection in the hilly jungle lands of thana Sherghati in the district of Gaya. This flower is also known by the following names:—*Seoli, sephalika, harasinghar*. The process of extraction of the dye is very simple. The white petals of the flowers are cast off, and the orange-coloured corolla tubes are well dried in the sun. They are then boiled or immersed in hot water until the colour is extracted. The infusion is an orange colour, which is very fleeting. *Singhar* is used generally as an auxiliary to other dyes. It is also used for dyeing liquor.

The *palas* tree, like the above, is not especially cultivated for its dye. It is found growing wild in gardens and jungles. The dye is extracted simply by boiling or steeping the flowers in hot water. It is used for dyeing cotton and *sola* articles.

The *latkan* tree, like the *palas* and *singhar*, is to be found growing wild in jungles and gardens, and does not appear to be cultivated for its dye. It is known also as *bilati-haldi*. The seeds are used for the preparation of the dye. A deep yellow and red colour is obtained from the pulp which surrounds the seed. Though fleeting, it is said to last longer than the colour obtained from safflower. By certain combinations, different depths of yellow colours are obtained. It is used for dyeing both silk and cotton. The dye itself is obtained by pounding and boiling the seeds in water mixed with soda and alum. The following process is described in the report received from Hooghly:—"In three seers of hot water one seer of *latkan* seeds are well thrashed and rubbed. When the water becomes red, and when very little remains of the seeds, the water is placed upon a hearth and heated. The seeds are then thrown away. The red water having subsided to $2\frac{1}{2}$ seers, $1\frac{1}{2}$ tolas of alum are poured into it. After two or three minutes, the red water is brought down. Thus is the colour produced."

The *kamala* plant is also found growing wild. The dye is obtained in the form of a powder from the epidermal glands which cover the fruit. The dye is extracted by drying the fruit in the sun, and then beating out the powder. The colour of the powder is red, but it dyes cloth yellow.

The different names by which the *al* plant is commonly known are *al, ach, aich, achu, aush* and *daruharidra*. It is reported to be extensively cultivated in the Hajipur subdivision of Muzaffarpur, where a superstition exists that whoever raises the first crop must know that his days are numbered. The old are generally therefore chosen for the purpose. The plants are allowed to grow for at least three years, and to attain a height of about seven feet before their roots are capable of yielding the dye. The finer roots are generally preferred to the thicker ones. The dye obtained from this plant is used in plain dyeing, and is one of the principal colours also in stamping cloths. It is obtained by cutting the roots in small pieces, and then pounding them well until they are converted into a powder, after which the powder is steeped in water.

ORDINARY PROCESSES EMPLOYED IN DYEING CLOTH AND THREAD WITH THE MORE IMPORTANT DYES.—The processes followed by native dyers in dyeing cloth with indigo are so well known, that nothing but a short notice of them need be given here. The ordinary method of dyeing with indigo, as observed by the writer, was as follows :—Indigo is diluted in water and then mixed with *sajimati* (Fuller's earth) water. A little more *sajimati* powder is then added to this mixture, as also lime and molasses. The solution is stirred from time to time for three or four days. The cloth to be coloured is then dipped into the solution and allowed to dry. This is repeated until the required colour is obtained, the depth of colour depending on the number of times the cloth is dipped into the fermented infusion,—*e.g.*, the *abi* (light blue) colour is produced by a very light immersion; the *asmani* (or sky-blue colour) is produced generally by one or two dippings; whereas the *nil* (indigo blue) and *surmai* (blue-black) colours are produced by four or five dippings. The proportions of the substances used are given in the report from Monghyr, and are as follows :—Indigo, 4 chitaks; *sajimati*, 1 seer 12 chitaks; lime, 8 chitaks; molasses and water, 2 chitaks. The indigo bath is strengthened often with other substances than those mentioned in the formula given above,—*e.g.*, with plantain ashes, with wood of the *Morinda tinctoria*, with *chakunda* seeds (*Cassia tora*), &c.

Indigo, in combination with other dyeing stuffs, gives black, purple, maroon, and green colours of different shades. In Chittagong, where the process is different from that commonly in vogue, indigo is taken and mixed with boiled *echi* seeds. Ashes of the *gatia* and other saline shrubs are mixed with cold water. The water is strained through a cloth into the jar containing the mixture of indigo and *echi* seeds until the jar is full. The whole is then stirred up with a stick at intervals, and in from two to six days it becomes a deep black. The cloth to be dyed is soaked in water, and left out in the sun for a short time. It is then dipped in the liquid and again put out in the sun to dry. This immersion and drying in the sun is repeated four or five times until the colour is sufficiently fast.

The mode of dyeing with lac is given in detail in the reports from Burdwan, Cuttack, Manbhum and Singhbhum, and is reproduced here :—

Burdwan.—"Cakes of dye are rubbed with a small quantity of water in a vessel. A large quantity of water is then added to dissolve the lac, and *sajimati* (an alkali) is then put in. The whole is then well mixed, and the mixture strained. The strained-off liquid is boiled, and to it is added some *lodh* (*Symplocos racemosa*) powder, when the liquid is strained a second time. The cloth to be dyed is then steeped in this liquid, boiled and then dried. By these means a permanent red colour is obtained."

Cuttack.—"Stick-lac is rubbed in an alkaline solution obtained by soaking the ashes of plantain leaf in water, and mixed with *lodh*, turmeric and alum. This preparation is then placed over a fire and allowed to boil. The cloth (silk) to be dyed is also soaked in alum and turmeric water, and placed in the sun to dry. When the above preparation is boiled down to about three-fourths of its quantity, it is mixed with a solution of tamarind, and the silk, when dry, is dipped into this boiling solution, where it is allowed to remain about a quarter of an hour, and then taken out and washed.

Manbhum.—The process is similar to that followed in Cuttack.

Singhbhum.—In Singhbhum, alum only is added to lac water, after which the mixture is boiled, and the substance to be dyed is then inserted into the boiling mixture, where it is coloured red.

Lac-dye is used in combination with other substances to produce a red dye, which is commonly used for colouring earthen toys and idols. The colouring is fixed by tamarind seed or *garjan* oil mordant. After the dye has dried, turpentine oil is put on to give the toys a glaze.

Turmeric by itself yields a dye of a fleeting character. Other ingredients, such as alum, are therefore added to it to produce a more lasting colour. A mixture of turmeric, *sajimati*, and lemon produces a brilliant yellow colour. The processes described in the district report from Monghyr, which are similar to those in vogue in other districts of these Provinces, are as follows :—

(*i*) Turmeric is finely powdered and put into water. The cloth is first dipped in the water, and it is then lightly washed in pure water, and then dipped in acidulated water, prepared from alum or lemon, when it is coloured a brilliant yellow. One chitak of turmeric will yield a deep yellow colour to a yard of fine cloth.

(*ii*) Turmeric is mixed with a solution of *singhar* flowers, and then a little alum is added. The cloth is dipped into the solution while hot, and is dyed deep yellow (*basanti*).

The liquid dye extracted by boiling *bakam* wood is of a red colour. To this, alum is added as a mordant, and the cloth to be dyed is dipped in this mixture. *Kakreja*, a deep maroon colour, is obtained from this dye-stuff. For this purpose, the cloth to be dyed is first soaked in water prepared with myrobalams (*hurra*) and *kasis* (*hirakosh*, or green vitriol), and then dipped into *bakam* water. A dark purple colour is also obtained similarly. The following details of the process of dyeing with *bakam* are extracted from the report received from Cuttack :—"The wood of the *bakam* tree is pounded and denuded of its bark. It is then boiled in the water for two or three hours, and after being allowed to cool, is sometimes mixed with a little lime. The yarn to be dyed is at the same time treated with a solution of alum and turmeric, and dried in the sun. When the yarn is quite dry, it is steeped in the water prepared from the wood, where it is kept some hours, and then taken out and dried. The materials for dyeing one seer of yarn are as follows :—*Bakam* wood, 1 seer 8 chitaks; alum, 2 chitaks; turmeric, 1 chitak; water, 5 seers."

In Muzaffarpur, where an orange colour is obtained from the bark, the material to be coloured is simply dipped into a decoction of *bakam*, obtained by boiling the bark in water.

In Chittagong, the following process is adopted for obtaining a *pucka* (fast) red colour :—"The bark of the *bakam* (called *senhya* in Chittagong) is powdered and boiled with water, and the water strained off into a vessel. This process is repeated three or four times. Then one seer of *jhuri* (*Magi-khre*, *Jasminum humile*) is mixed with 15 seers of water and boiled. These two liquid preparations are then mixed in equal proportions of 15 seers each, and 5 tolas of cocoanut oil and 5 tolas of alum are added. The mixture is boiled, and some portion of it poured over the cloth, which is in a wooden dish. The cloth is then put into a pot with some of the mixture and

boiled, and turned with a stick until the water has mostly evaporated. It is then taken out lest it should burn, and left to dry in the sun. To make the colour fast and deep, the process described is repeated three or four times."

The cloth to be dyed with *singhar* is immersed in an infusion of this flower, and then dried in the shade. A little acid or alum is sometimes added. The colour produced is known as *basanti*. Various shades of orange and red are produced by the intermixture of *kusum* flower, *singhar* flower, and turmeric. The processes have been already described. For colouring liquor, a small quantity of dried corolla tubes of the flower is tied in a piece of cloth, and kept in the receiver while the distillation of liquor is going on. About half a tola is used in colouring 32 gallons of liquor.

As with *singhar*, the dyeing with *palas* is effected simply by steeping in the infusion obtained by boiling the flowers in water. Alum is sometimes added. The colour produced is a fugitive yellow inclined to red. Dyers use this colour in combination with other dyes, such as *latkan*, *singhar* and turmeric.

When silk is dyed with *latkan*, the process is to mix a *powa* and-a-half of *latkan* seeds with 15 seers of water and half a seer of *sajimati*, and to boil the whole with the silk to be dyed. The result is a yellow colour. Cotton may be dyed in the same way. In Nadia, the colour is made fast by the following process :—"The bark of the *babul* is pounded and boiled with water in an earthen pot. If cotton cloth is to be dyed, the cloth is steeped in the decoction thus prepared and kept for 24 hours. After drying it in the sun, it is steeped and kept for 12 hours in *latkan* solution obtained by boiling *latkan* seeds in water. The cloth is again dried in the shade, and then steeped for 6 hours in *babul* water. It is dried again, and then washed with pure water." This gives a fast orange colour. Silk is dyed in Nadia in the same way, with the following variation in the time for steeping :—"3 hours in *babul* water, 4 hours in *latkan* water, 3 hours again in *babul* water, and 18 hours in alum water."

The process of dyeing with *kamala* at Burdwan is as follows :—"*Sajimati* is dissolved in water, strained and then boiled. As the boiling goes on, the *kamala* powder is thrown into the liquid, boiled, and afterwards alum is added. When the mixture has been boiled for some time, the cloth to be dyed is dipped into the hot liquid and allowed to remain in it for some time till the proper yellow colour is obtained. The cloth is then washed and dried."

The process of dyeing with *al*, as followed in Patna and generally in other districts where the *al* dye is used, is rather elaborate, and produces a fast red colour, which does not go off by repeated washes. It is thus described :—"The cloth to be dyed is first given to the washerman to clean thoroughly. It is then steeped in water mixed with *hurra* (*Terminalia chebula*), and the cloth is then dried. This is done to fix the colour on the cloth. For a piece of five yards, it will be necessary to use two pice weight of the *hurra*. The cloth is then dipped into a mixture prepared of four parts of turmeric, four parts of *lodh* (*Symplocos racemosa*), and one part of alum. It is then again washed and dried. Pieces of *al* wood are well powdered, and about a quarter or one-third of a seer of the powder is boiled for three or four hours with six seers of water. About a chitak of *dhao* flower (*Woodfordia floribunda*) is also put into it. The cloth to be dyed, which has been bleached, as previously described, remains dipped in it for all the three or four hours, and thoroughly absorbs the red colour of the *al*."

The dust obtained from the sawings of *jak* wood is used by dyers for getting a *basanti* or yellow colour. It is generally used for silks. Ordinarily, cloth is coloured by simply steeping it in a solution obtained by boiling sawdust of *jak* wood in water. The silk-dyers of Murshidabad use the following process :—"Sawdust of *jak* wood is mixed with the leaves of the *bakas* plant (*Justicia adhatoda*), and then boiled in water. The decoction is then strained, and the cloth to be coloured is then immersed in the water thus obtained, when a yellow colour is produced." From Chittagong the following interesting account has been received :—"The following process is used by Buddhist priests (Funghi) or by their disciples in dyeing the yellow robes worn by them. The heart of an old *jak* tree is immersed in cool water for two or three days, and then boiled in a brass pot with some alum. When the colour is sufficiently deep, the water is poured into a vessel; more is poured into the vessel containing the wood, and more colour extracted. The cloth to be dyed is placed in a wooden dish, and kept soaked with the dye for two or three days. It is then dried in the sun. The process is repeated from three to six times to the satisfaction of the Funghi."

The only districts from which information has been received of the *toon* dye are Shahabad and Muzaffarpur. The *toon* plant is, however, found in various districts of Bengal; and its flowers, which are generally collected and sold by the poorer classes, are used for producing a yellow colour. The following description of the processes of extraction and dyeing has been obtained from Muzaffarpur :—"One seer of *toon* flowers are boiled in two seers of water and kept on the fire until the quantity of the mixture is reduced to one seer. The liquid is then strained, and the cloth to be coloured is immersed in it, and then dried in the shade." The colour obtained is fugitive.

MORDANTS AND AUXILIARIES.

In addition to the dyes mentioned in previous paragraphs, there are several substances which are for the most part employed as mordants—*e.g.*, *lodh* (*Symplocos racemosa*), *haritaki* or *hurra* (*Terminalia chebula*), *dhaiphul* (*Woodfordia floribunda*), *babul* (*Acacia arabica*), *chakunda* (*Cassia tora*), *amla* (*Phyllanthus emblica*). Along with the above may be mentioned the following ingredients :—Alum, gum arabic, lime, *kasis* (protosulphate of iron), *sajimati* (an alkaline earth). The bark and leaves of the *lodh* tree, which grows wild in the jungle, are used in dyeing. *Lodh* yields a principal dye; but as it is chiefly used as a mordant, it is mentioned here. *Lodh* bark by itself yields a yellow dye, but no mention has been made of this in the reports received now, which show that it is chiefly used as an auxiliary to lac, *kamala*, and *al*. The way in which it is used with lac and *al* has already been described. With *kamala* it gives a fast yellow colour. The process employed in getting the colour is thus described in the Patna report :—"Quarter seer of *lodh*, half a seer of *sajimati*, and 1 chitak of molasses are well mixed with 10 seers of water, and then put on the fire for about three hours. The mixture is then taken

down from the fire, and the thread to be dyed is then put into it and pressed hard with some heavy substance for about half an hour. The thread is then taken out and well wrung. *Kamala* powder is then well rubbed over it. The thread is again dipped into the mixture previously obtained and again put on the fire. It then acquires a fast yellow colour." It is stated also in the Patna report, that a fresh green colour is obtained from the thread dyed yellow as above, by dipping into an indigo solution and then into a solution obtained by mixing turmeric, *hurra*, alum and water.

The fruit of the *haritaki* plant is used in dyeing. It will already have been seen that it is largely employed as an auxiliary with various dye-stuffs. It is also used extensively for producing black dyes in combination with protosulphate of iron. Interesting accounts have been received from the Sonthal Parganas, Manbhum and Singhbhum of the processes employed in obtaining these black colours, which are now reproduced.

In the Sonthal Parganas, waist bands and beaded strings are made from *tasar* thread, which is dyed black with *haritaki*. For this purpose, ripe and unripe *haritaki* berries are taken and well ground, and then mixed with water. The *tasar* thread is dipped into the mixture, and allowed to remain for 12 hours. It is then taken out and dried, and finally placed in black clay (*pankh*) for 12 hours. This process is sometimes repeated twice to obtain a black colour.

In Manbhum, the materials usually employed to dye black are *haritaki*, boiled rice, iron, and *hirakosh* (protosulphate of iron). The process is as follows:—"The fruit of the *haritaki* is ground to a fine powder. It is then mixed with water and allowed to stand for some time. The water is then poured off, leaving the solid matter behind. The thread to be dyed is dipped into this water and then dried. This is repeated three times. The thread is then ready for dyeing, and the dye is prepared as follows:—A quantity of boiled rice is mixed with water and allowed to stand two or three days. The water is then poured off, and to it a quantity of clear water added. Into this are put a piece of iron, and the refuse of iron collected from a blacksmith's anvil, and the whole is allowed to stand for six or seven days. *Hirakosh* is then added, and the thread to be dyed dipped into this mixture two or three times."

In Singhbhum, the substance to be dyed is put into a mixture of *haritaki*, iron dust, *hirakosh*, and Malacca bean (*Semicarpus Sp.*).

In Chittagong, a fast black dye is prepared from the powdered bark of the *gatia* shrub, which is probably a *Terminalia*. The powder is mixed with water and boiled. The water is then strained off and fresh water is added, and the boiling is commenced again. After three boilings, alum is added to the separated water, and the mixture is then poured over the cloth, which is kept moistened in a wooden dish. The mixture is rubbed in well with the hands and dried in the sun. The process is repeated four or five times until a fast black colour is obtained.

The *babul* is a familiar tree in many parts of Bengal. The bark of this plant is used for dyeing to some extent, but the principal use to which it is put is that of tanning leather. In the report received from Monghyr, it is stated that *babul* bark, when boiled, dyes cloth of a *khaki* colour. It is made fast by throwing in a little mustard oil into the boiling water. A pale yellow colour is obtained from *babul* bark in the following manner:—"A *babul* solution being made by boiling in water, the cloth to be dyed is steeped in it, and dried. It is then immersed for eight hours in a decoction made from pomegranate (*anar*) rind, *singhar phul*, alum, and goat's milk, boiled together with water on a cowdung fire."

PRINTING-STUFFS AND PROCESSES EMPLOYED IN PRINTING.

The colour obtained from *al*, as already stated, is used extensively in stamping cloths in different fancy patterns. The cloths are stamped with moulds of different patterns engraved in wood. The process described in the Patna report is that substantially adopted by most calico printers, and is therefore reproduced here in full:—

"A paste is prepared of about 1 seer of resin, ¼ seer of alum, ⅛ seer of *lodh* and turmeric, well powdered and mixed with 4 seers of water. The paste is well rubbed with the hands, and then it is strained through a thin cloth. The ink thus obtained is used for stamping. After the cloth has been stamped, it is washed and dried. The cloth is then soaked in *al* water prepared as described above and boiled. The portions of the cloth covered with the stamps absorb the *al* colour, while the portions not so covered do not take the colour. This gives a beautiful red colouring to the cloth."

A reddish-black is also obtained thus:—"Half-a-seer of molasses, 1 chitak of well-powdered iron, and 1 chitak of *kasis* (protosulphate of iron) are fermented with 10 or 12 seers of water for 10 or 12 days. After the ferment is complete, the mixture is strained through a cloth, with the addition of resin and a small quantity of *ghi*. This gives the paste to be used for stamping. After the stamping is done, the cloth is washed and dried, and then soaked in *al* water, as described above."

It will be interesting here to add the following account of the process of stamping silk cloth, as practised in Serampore in the Hooghly district:—

"*Dhaiful* (*Woodfordia floribunda*), which is a red flower, is mixed with alum, *sofada*, *haridra*, gum arabic, and sugar of lead, and then water being added to them, a cream colour is produced. Then additional water mixed with gum is put in wooden boxes of about 3 feet in length and 1½ feet in breadth. Over these boxes, filled with gum water, wooden frames, with oilcloth at the bottom, are placed, and over the oilcloth a blanket. On this blanket, the coloured liquid produced from the articles noted above is applied and brushed. Ultimately, the wood-cut patterns of various kinds tinged with this colour are pressed on the silk cloth spread on a table. The cloths thus dyed are then washed with water, and afterwards they are boiled in hot water with *manjista* (*Rubia cordifolia*), and the result is a beautiful cream or almond-coloured (*badami*) stamped cloth."

Mr. Collin states, in his Report on the Industries of Bengal, that madder (*Rubia tinctoria*), cochineal (*Coccus cacti*), and turmeric are used in the silk-printing firms of Serampore, and that their dyes are fixed by the use of alum and sulphate of iron (*kasis*). The stamps for printing are carved out of tamarind wood by artists in Barrackpore, and show great skill.

From Gaya, it is reported that the *Chapgars* also use silver and gold, which they fix to the cloth by the gum prepared from *babul* wood. This tinsel painting is also largely done in Calcutta. Gold foil is generally applied on a violet ground, and silver on red.

The patterns used in printing are chiefly floral or geometrical.

THE COTTON FABRIC INDUSTRY OF THE MADRAS PRESIDENCY.

By Mr. EDGAR THURSTON, Superintendent, Madras Government Museum.

Two admirable articles entitled "The Industries of Madras" and "The Printed Cotton Industry of India," by Mr. E. B. Havell, formerly Superintendent of the Madras, now of the Calcutta School of Arts, have, within the last few years, been published in the *Journal of Indian Art* (1888 and 1890). In these articles repeated reference is made to the decline of the indigenous cotton fabric industry, and the degree to which it has suffered from European competition. The scope of the series of monographs, to which I have been invited to contribute, being industrial rather than artistic, it is my duty, with a practical outcome in view, to emphasise and draw more prominent attention to this industrial decline, and the influences which have been at work to produce it.

When, as at the present day, the bazaars of Southern India are flooded with imported piece-goods of British manufacture (which, in conjunction with mineral dyes, must be the key-note to the present monograph), it is curious to look back and reflect that the term piece-goods was originally applied in trade to the Indian cotton fabrics exported to England. "In 1700," Sir George Birdwood writes in his *Industrial Arts of India*, "a law was passed, by which all wrought silks, mixed stuffs and figured calicoes, the manufacture of Persia, China, or the East Indies, were forbidden to be worn or otherwise used in Great Britain. It was particularly designed for the protection of the Spitalfields silk manufacture, but proved of little or no avail against the prodigious importation and tempting cheapness of Indian piece-goods at that time. . . . . Cotton was first manufactured in Scotland in 1676, and in Glasgow in 1738, and in Manchester the manufacture of printed calicoes was regularly established in 1765."

Exactly a century ago (1796-97) the value of piece-goods from India imported into England was £2,776,682, or one-third of the whole value of the imports from India, while the closing years of the present century find the indigenous cotton fabric industry of Southern India strangled by the octopus-like grasp of the enterprising and far-reaching British capitalist, whose influence is manifest even in remote up-country bazaars. The exports have shrunk into trifling insignificance, while the imports of piece-goods (cotton and linen) to the ports of Madras have, as shown by the subjoined statement, assumed vast proportions :—

1886	₨20,523,956	1895	₨19,459,073

The nature of the cotton and linen piece-goods imported will be intelligible, to those familiar with the commercial terms, from the following extract from the "Statement of Imports to the Ports of Madras," during the month of March, 1895 :—

Great Britain.	Chintz	...₨422,966	Turkey-red cambrics	...₨105,115	Great Britain.
	Grey shirting ...	... 792,871	,, shirting	... 76,724	
	,, madapollam ...	... 8,509	,, mull ...	... 27,672	
	,, drill	... 31,821	,, coloured dresses	63,717	
	,, jaconets ...	... 163,590	,, printed scarfs...	36,246	
	,, mull	... 127,561	Grey dhovettees ...	 591,998	
	White jaconets ...	... 341,669	White ,, ...	... 25,190	
	,, shirting ...	... 92,691	Handkerchiefs ...	... 9,004	
	,, cambrics ...	... 77,773	Canvas	... 6,903	
	,, mull ...	... 178,221	Linen piece-goods...	... 3,281	
	Book muslin ...	... 3,936	Piece-goods, other sorts	... 2,894	
	Coloured muslin ...	... 33,818			
Calcutta ...	Piece-goods, grey ...	.. 2,675	Piece-goods, white...	... 8,363	Bombay.
	,, white	... 26,599	,, coloured	... 16,600	
	,, coloured	... 9,054	,, grey	... 18,652	
		Total ...	Rs. 3,327,223.		

It is worthy of note that, while the imports of cotton piece-goods to the ports of Madras during the year 1895 were valued at Rs. 19,459,073 with a monthly average of Rs. 1,621,589, the exports thereof were valued at only Rs. 3,646,946 with a monthly average of Rs. 303,912. The value of the imports, in fact, exceeded that of the exports by the large sum of Rs. 15,812,127. The imports included very large consignments of Turkey-red fabrics (cambrics, shirtings, chintz, jaconets, mull, dresses, and printed scarfs) valued at Rs. 2,387,166, Turkey-red twist valued at Rs. 3,544,554, and other coloured twist valued at Rs. 1,883,232. Turkey-red (a mineral dye), which is largely responsible for the decline in the use of the beautiful vegetable red dyes in the dyeing of cotton fabrics,

appears on the scene, so far as I can ascertain, for the first time in the official trade statement for 1866-67. The exports to Great Britain in 1895 included Madras handkerchiefs (which are repeatedly referred to in "Uncle Tom's Cabin") to the value of Rs.306,305, and Ventupallam handkerchiefs to the value of Rs.2,200. Emigration of natives takes place from Southern India to Natal, Mauritius, the Straits Settlements, Ceylon and Burma, and there is a consequent export to these countries of cotton fabrics adapted to the fashion and requirements of the emigrants, who, in their voluntary exile from home, welcome the familiar Madras handkerchief, dhovettee, &c. The yarn used at the present day in the manufacture of good Madras handkerchiefs is dyed with seruver (*Oldenlandia umbellata*—chay-root or Indian madder) or with Turkey-red and surul-pattai (*Ventilago Madaraspatana*); and I am told that these handkerchiefs fetch a considerably higher price in the foreign market when made with country-dyed yarn than with yarn dyed in Europe, because they are exported for sale to Madras natives working in British colonies, who prefer the original vegetable colour to the modern hybrid imitation.

Very intimately connected with the cotton fabric industry of Southern India at the present day is the employment of aniline and alizarine dyes, the imports of which have, as shown in the following statement, rapidly increased in value from only Rs.20,868 in 1886 to Rs.306,649 in 1895 :—

ANILINE AND ALIZARINE DYES.—Imports to the ports of Madras from Great Britain, Hamburg, Antwerp, France, Trieste, Bombay and Calcutta :—

1886	Rs.20,868	1895	Rs.306,649

In his "Review of the Trade of India," 1895-96, Mr. J. E. O'Conor states that the dyes imported into India "are mainly alizarine, of which 5,072,101 lbs. were imported, little more than half that quantity (2,693,272 lbs.) being aniline. The dyes are mostly of continental origin, as will be seen from the principal sources of supply noted below; indeed, it is not certain that even the small proportion received from the United Kingdom is not continental :—

	1885-1896.		1885-1896.
United Kingdom	487,588 lbs.	Germany	584,070 lbs.
Belgium	4,581,441 „	Holland	1,151,225 „
Austria-Hungary	616,827 „	Italy	336,493 „

"The total value of all the dyeing and tanning materials imported was Rs.858,893, alizarine and aniline dyes being represented in that sum by Rs.703,900, being about 82 per cent. of the whole."

I learn further from the "Annual Statement of Trade and Navigation, Bombay Presidency," 1895-96, that "the bulk of aniline and alizarine dyes is shipped from Belgium (Antwerp), but Holland (Amsterdam) now has a very large share of the alizarine trade. In both cases the goods are mostly of German manufacture. There has been a brisk demand for these dyes for dyeing silk and cotton goods, and new markets, both in and out of India, are being opened up, while low prices have ruled. Alizarine is now largely imported in lumps, and the better classes of aniline are growing in favour. It is said that numerous new companies are starting in Germany, so that still lower prices and larger imports may be expected."

In explanation of the names aniline, alizarine and Turkey-red, I may quote the following note, which was drawn up for me by a chemical expert: "Turkey-red received its name from the fact that the madder root (*Rubia tinctorum*) was largely grown in, and exported from Turkey and the Levant. The active principle in madder is alizarine, which is obtained from it by a fermentative process somewhat akin to that by which indigo is prepared. After the synthetic production of alizarine from anthracene, the natural source of the dye ceased very largely to be drawn on, and the cultivation of madder is now almost, if not entirely, obsolete. All the Turkey-red dyeing is now done with artificial alizarine; and, in addition, there are dyes of almost every variety of shade, especially blacks, browns, purples, reds, and yellows derived from the same source. By aniline dyes, strictly speaking, are meant only those derived from aniline, and the number of them is very large. But, in a wide sense (a popular one only) it is applied to an enormous number of artificial dyes, derived from a great variety of coal-tar products. There are thousands of them. The chemist refers to them all as synthetic dyes."

As in England, so in Southern India, fashion plays an important rôle in connection with native dress, both male and female. The assumption of the turban by the autochthonous Todas of the Nilgiris; the replacement of the tribal turban of the Badagas by knitted night-cap of bright red or orange hue; the pork-pie cap, beloved of native student, and oft-times ornamented with monstrous knitted flower pattern; the unstarched white shirt, patent leather boots, and white socks of the Bengáli Bábu clerk; the adoption by native cricketers of machine-made coloured blazers, as evil in colour contrast as those of many a house eleven at an English public school, are but a few examples of modern change in native male attire for the worse. Quite recently I was shocked by the appearance of a member of my staff in a new patch-work white shirt adorned with no less than six individual and distinct trade-marks, representing the Prince of Wales, Britannia, an elephant, &c. A native of the labouring classes, when clad in plain white loin cloth stained with indigenous seruver dye, and white or seruver-red turban, is, to my mind, far better dressed than when his turban is dyed with Turkey-red, and the loin-cloth is of white imported fabric with the much-prized trade-mark, or replaced by unseemly pantaloons made of some gaudy imported piece-goods. No longer does the jungle tribesman, who has emerged from his uncivilised condition to work for regular wages on planters' estates, rest content with a simple country-made cloth around his loins, but appears, on high days and holidays, clad in turban or cap and woven coat of English cut. And, on the occasion of a recent visit to the village of a hill-tribe, I found the entire male community dressing in gorgeous apparel for a sacred festival in a neighbouring grove, and painting their faces with sect-marks with the aid of miniature looking-glasses and coal-tar dyes, which, with imported fabrics, are exposed for sale at their weekly market.

Between fashion in female dress in England and Southern India there is this marked difference, that, whereas in England change in form (with the bloomer and bicycle costumes as extreme examples in modern times) is the

most conspicuous feature, in Southern India, while the shape of the *sâri*, jacket and petticoat have remained unaltered, a radical change has taken place in recent years in both design and colour, owing to the wide-spread introduction of imported printed fabrics, which now constitute a conspicuous feature of bazaars throughout the Madras Presidency. Three primary factors are mainly responsible for guiding fashion so far as native female dress in Southern India is concerned, viz., novelty, the quaint or grotesque, and artistic beauty. And the least concerned, in these days of the decline and fall of South Indian industrial arts, is artistic beauty. The love of the grotesque, which prevails among the natives of Southern India, is best illustrated by the carvings on Hindu temples, and by mythological paintings, and is responsible for the demand for the eccentric devices for female dress, with which the bazaars are now stocked, and which are disseminated, through the medium of weekly fairs or markets, to remote places which do not rejoice in the equivalent of milliners' shops.

The value of an average piece of imported British printed cotton fabric will, I am told, run to about nine rupees. Of a particular set of printed fabrics, which are imported into Madras from Manchester or Glasgow, the native merchant, who really commands the situation, may find one pattern which takes on with the natives, and can be disposed of in large quantities for fifteen rupees per piece with a resultant wide margin of profit. But, for some reason, after a successful run, the piece has to be taken off, as the demand for the particular pattern comes to an end in favour of another. The result is that the merchant has stored in his godowns cases of fabrics, which originally sold for fifteen, but for which he cannot get even three rupees. There is, however, a steady demand for a certain number of stock patterns, which have a ready sale at a price which leaves a moderate margin of profit.

In addition to new and showy design, which will captivate the native eye, the ticket or label on each piece is an important element of attraction, and as much ingenuity is displayed in the production of the grotesque on the ticket as on the fabric. And I have before me, as I write, a glazed label depicting a group composed of a native lady with turmeric complexion, clad in a pink *sâri*, seated on a maroon cushion, and engaged in conversation with a naked little boy blue, while a chubby pink child looks on round the corner of a violet *purdah*.

We are now-a-days familiar, through the medium of the papers, with litigation in connection with trade-marks in their commercial aspect. A few months ago an incident occurred, which related to trade-marks in their religious aspect. A public meeting of Muhammadans assembled in the mosque at Ootacamund, with a view to taking steps to present a petition to the Governor to stop the importation of a certain brand of cigarettes made in Germany, as the trade-mark represented a bird of paradise and the *kalima* (the Muhammadan confession of faith) round its neck as being an insult to Muhammadans.

Moochees (designers) are kept constantly employed by piece-goods merchants in devising and painting new patterns for despatch to Europe, which are freely canvassed and criticised with a view to selection or rejection. Those selected are sent to Manchester or Glasgow, and there engraved on copper cylinders, which constitute a very valuable portion of the plant of print-works.

The *raison d'être* of the gaudy eccentricities of device in female apparel, men's shawls, and turbans, which are now endemic in the bazaars of Southern India, is the endeavour on the part of the merchant to secure a fabric which will be attractive and command an extensive sale combined with a large profit. For example, only a few months ago a fabric, intended for making up into female petticoats, arrived in the Madras market, with a pretty flower and bird device on a ground of two shades of red, with a wondrous border composed of an endless procession of white bicycles of ancient pattern with bright green gearing and treadles, separated from each other by upright stems with green and yellow fronds growing out of a conventional border. And the manner in which the bicycles were worked into the design was undoubtedly clever. In another recent importation the same bicycles appear on a cloth with design of flowers and fishes. The whole attraction in these examples, selected out of many patterns which I have inspected while preparing this monograph, lies in the representation of the bicycle, which is fast establishing itself as a "common object of the sea-shore" in Madras.

The native scale of colour, except in so far as it has been perverted by a long course of imported colour-printed fabrics, to which natives have got accustomed, differs from the British colour-scale, as represented by dyers, and mainly in this, that the English colours tend to be crude, while the native colours are of more subdued or compound tints. For example, the beautiful vegetable reds of Madura and Conjeeveram are not what we should call a true red like the imported Turkey-red, but, as can be readily seen in some of the beautiful woven cloths in the industrial section of the Madras Museum, red with a slight admixture of blue.

Writing to me *d propos* of this monograph, one, whose authority in matters industrial I admit, says:—"Let me express a hope that you will not tread the track beaten by writers, who copy each other in abusing mineral dyes. Everything that was said against these dyes in the old days was true, but between the old days and the present day there is a vast difference. Most of the dyes we now import are alizarine, not aniline. They are not crude in colour, and many of them are practically quite fast. The advance made in the manufacture of these dyes is equal to the advance made in chemistry or photography. You might as well abuse the platinotype and carbon print of to-day on the basis of what was said of the primitive daguerreotype, or the silver print which immediately followed it, as abuse the alizarine dyes of to-day on the basis of what was said against the anilines of twenty or thirty, or even ten years ago. Of course, as regards fabrics that may be classed as art fabrics, the use of mineral dyes is not to be encouraged, but I am thinking of the *kapra* (cloth) of the plebs, of which a hundred thousand yards are made to one yard of art fabrics."

I do not, for a moment, contend that the imported printed fabrics which form so conspicuous a feature of the female attire of the middle and lower classes of the native community, should possess the artistic merit, either in colour or design, of the lovely *sáris* manufactured at Adoni, Arni, Kampti, Madura, Tanjore, and other places, or the beautiful satins of Ayyampet, of which fine examples are exhibited in the industrial section of the Madras Museum. But I unhesitatingly condemn both colour and design of many of the imported colour-printed fabrics, which, in a native throng, offend the eye when brought in contrast with the more subdued colouring of the woven

cloths made by native weavers with country-dyed yarn, or imported yarn dyed with mineral dyes in Europe.

The Madura weavers formerly used vegetable dyes of local manufacture far more extensively than at the present day, and Madura was famed for the preparation of a purely vegetable deep-red dye. The preparation of vegetable dyes is now limited to blue and black. The employment of vegetable dyes was abandoned, as it was found to be easier and cheaper to dye with imported mineral dyes, and cheaper to weave cloths with imported than with country-dyed yarn. The old vegetable dyes are superior to the mineral dyes, and, after repeated washings, cloths dyed with vegetable dyes keep their colour better, and last longer. The colour of cloths dyed with the Madura vegetable dye becomes actually brighter after washing instead of fading. The native population of Madura is attracted by the gaudy English printed fabrics, which are sold in the bazaar. For marriage ceremonies some castes will not wear imported fabrics.[1] Even now, in spite of the great influx of these fabrics, there is a large demand for locally-woven and dyed cloths. This is evident to anyone who takes a walk through the Madura bazaar towards sunset, and studies the dress of the native throng, in which locally-woven cloths with prevalence of yellow, and dyed or stained cloths with prevalent red, predominate to a marked degree.

Some years ago barrels of mineral dyes were sent to the Madura dyers by Bombay merchants as a speculation. Experiments were made with these dyes, with a view to ascertaining whether it was possible to obtain with them a colour resembling that produced with vegetable dyes, but at an appreciably cheaper cost. These experiments led to results which from the dyer and merchant's point of view were quite satisfactory. For the last eight or nine years the dyers have, for the production of the deep red colour, which constitutes a conspicuous feature of native dress at Madura, used a mineral moist colour of dark yellow, which they obtain from Bombay in casks. One result of the introduction of this mineral dye has been that the cultivation of various plants, which was formerly carried on solely for the sake of the dyers, has been abandoned. In the preparation of the dye a watery solution of leaves, called *kayam kolli*, is made, and the mineral colour added to it in a fixed proportion. These leaves are derived from a shrub, which grows wild at the foot of Alagar hill, about twelve miles from Madura. Preparatory to dyeing, white yarn or fabric is treated with a mixture of gingelly oil and ashes of the indigo plant, called *jum-jum*, and obtained by setting fire to the plant, and sprinkling salt sand on it while it is ablaze. The yarn or fabric so treated is placed in a copper boiler containing the hybrid dye mixture, which is boiled until the colour has been absorbed to the required degree. The dyers know, as the result of experience, the correct proportion of yarn or cloth to a given quantity of solution. Different shades are obtained by successive re-boilings, *e.g.*, a pale pink cloth, which was shown to me, had been boiled twice, and a cloth of deep red hue five times.

The demand for Madura red cloths, dyed by the old process, in which only vegetable dye was used, is now very slight. But, when specially required on account of their more delicate shades, as compared with dyed cloths turned out by the modern process, they can be made to order. Only those who possess a fine colour sense would order such cloths, as the modern product is such a close imitation of the older vegetable colour. An ordinary woman's cloth produced by the modern process costs only Rs. 1-8, whereas, if dyed by the genuine vegetable process, it would cost Rs. 2-8 or Rs. 3. Even for red cloths of the finest quality, including those interwoven with gold thread for the richer classes, the modern process is resorted to; and, sad to relate, the famous Madura vegetable red dye has practically ceased to exist. Its preparation is, it is true, still understood by existing dyers, old and young; but, unless some unforeseen reversion to abandoned methods occurs, future generations will arise, not only in Madura, but throughout Southern India, to whom the once justly admired vegetable dyes, and the fabrics dyed therewith, will be but a hazy tradition of a bygone age. The spurious imitation of the deep-red colour is certainly, as imitation, very successful, and bears testimony to the skill in technique of the self-taught dyers without recourse to State aid or technical school.

A Kumbakonam weaver is not so well off as his father, who was a weaver, and had not to contend against imported printed fabrics. The weaving industry has declined greatly, in recent years, owing to the importation of these fabrics. He now has only four looms at work instead of eight. Some weavers, who formerly owned looms, are now working as cooly weavers for daily wages. Cloths dyed with mineral dyes look bright and attractive when new, but fade. These dyes are, however, cheap and easy to work with, as no long process of preparation is necessary. Would be glad to see the imports of printed fabrics and mineral dyes abolished, as purchasers come and abuse the bazaar vendors because the colours fade, and some demand their money back on the ground that a bad article has been supplied to them. Madura weavers, who considerably outnumber the Kumbakonam weavers, send red cloths dyed with mineral dyes for sale at Kumbakonam. They are cheap, so natives naturally buy them. The merchants, who sell printed cloths, do not care about quality or good design, so long as they make a good profit. Merchants only buy such cloths as are likely to attract by brightness of colour, and command an extensive sale. Considers that the women of Kumbakonam do not look nearly so well-dressed now as they did before the introduction of imported printed fabrics and cloths dyed with mineral dyes. The price of the vegetable dye-stuff *noonaver*, which was formerly largely cultivated near Kumbakonam, has come down from Rs. 14 to Rs. 4 per maund, and even at this greatly reduced rate it cannot be used, as its preparation takes several months. Thinks that Government should prohibit the import of printed fabrics and mineral dyes, or tax them very heavily, so that the indigenous industry may be protected. No action short of this will improve the prospects of the weavers. The import of mineral dyes to Persia is, or was prohibited with a view to protecting the carpet industry against degeneration. And the importation of mineral dyes into Kashmir is, I am informed, subject, like that of indigo and other dyes, to the general rate of import duty, Rs. 6-10-3 per cent., which, added to our 5 per cent., is a pretty heavy load of taxation.

Ayyampet weavers manufacture cotton, woollen and silk rugs. Vegetable dyes are used in the preparation of the yarn for the woollen and silk rugs, and Europe-dyed yarns for the cotton rugs. Imported dyed yarns look

[1] "The great objection among Hindus to European long-cloth apart from its want of durability is that the coloured and embroidered border of the native cloth is wanting. So, on occasions of ceremony, the native cloth is still used. But, within the last year or two, cloths have been introduced into the market, exactly similar in appearance to the common country-bordered white cloth, and selling at two-thirds the price or less."—HAVELL (*Journal of Indian Art*, 1890).

bright at first, but fade sooner than yarns dyed locally with vegetable dyes. The number of weavers is now very small as compared with former days, and there are only four weaving houses in Ayyampet. The industry has declined owing to the competition of jail-manufactured rugs, which have appreciably interfered with their means of earning a livelihood. They remember the days when the trade in Ayyampet carpets was brisk, when they always had a reserve stock in hand, and made carpets 30 ft. by 20 ft. or 20 ft. by 10 ft. A cotton rug with parallel stripes of mineral red, yellow and green, and indigo blue, and another with wide areas of red, blue and white parallel stripes, interrupted with narrow areas with blue and white pattern, possessed no artistic merit, and were not nearly so good in colour and design as the woollen and silk rugs which were brought to me for inspection.

Bhaváni weavers manufacture cotton rugs on vertical and horizontal looms, of which the former have been recently introduced. Rugs woven on the vertical looms are the most expensive, as they are thicker, and the texture is better than that of the rugs woven on the horizontal looms of ancient pattern. They, moreover, require more skilled labour in their manufacture. Ordinary rugs with red and black stripes cost Rs.7 if made on a vertical loom, and Rs.5 - 8 if made on a horizontal loom. For the warp, white yarn, spun at the Coimbatore Spinning Mills, and for the woof imported dyed yarns of various colours are used. Sometimes the weavers purchase yarn of local manufacture at the weekly market and dye it black. Black yarn dyed locally, and imported red yarn, never lose their colour. All the other dyed yarns which they use lose their brilliancy after repeated washing. The rugs are sent to Madras and Trichinopoly, as well as to various places in the Coimbatore district, in which Bhaváni is situated. Some are sold to pilgrims, who come to carry out the bathing ceremonial at the confluence of the Bhaváni and Cauvery rivers. Otherwise, there is not a great demand for the rugs, the manufacture of which is in a declining condition owing to lack of encouragement.

Adoni weavers manufacture cotton rugs and carpets on horizontal looms. The weavers are Muhammadans. They used indigenous vegetable dyes until about 15 years ago. The yarn is either dyed locally with imported mineral dyes, or purchased ready-dyed from Europe. The mineral dyes are durable and brighter than the vegetable colours. The greatest number of looms owned by a single individual is ten. They are not so well off as the last generation, as the number of loom-owners has increased, and the profits have consequently to be shared among a greater number of houses. They have, moreover, to compete against cheap imported carpets, and carpets of jail manufacture with patterns similar to those which they turn out. The carpets are sent for sale to Bombay, Calcutta, Madras, London and other places. Sometimes they receive large orders. The carpet merchants pay for the privilege of selling their goods on the railway platforms at Adoni, Gooty and Guntakal, where they do a good business with natives, who buy the rugs for bedding, and Europeans, who buy them for tent carpets, hold-alls, &c. The pattern of the majority of the rugs and carpets consists, as at Ayyampet, of parallel stripes of various colours. Carpets with diamond-shaped device and other more complicated patterns, which require skilled labour, are also manufactured. The carpets are absurdly cheap. One with parallel stripes, 8 ft. by 3 ft. 10 in., is sold for Rs.2 - 8. Such a carpet takes a man a working day of ten hours to make, and he is paid six annas. One with diamond pattern, 7 ft. 4 in. by 4 ft., is sold for Rs.3 - 4, and, after paying the weaver twelve annas and deducting the cost of the material, a profit of about two annas is left.

I learn from recent official records that "acute distress has at the present time arisen among the weaving population of Adoni town. The circumstances of these weavers are peculiar, as they all work on a system of advances from money-lenders and cloth merchants, whose debtors they are. Owing to the sudden rise in grain prices all over India and the threatening state of the season, the cloth merchants in Adoni, finding no market for woven cloths, have been obliged to stop all advances to the weavers who work for them, and the result is that the looms in the town, numbering over 4,000, have suddenly stopped working, and the weavers are without employment, and face to face with starvation." Steps have been taken for the relief of the weavers.

Carpets are exported from Kurnool in very large quantities to Hyderabad, Berar, Nagpur, Agra, Cawnpore, Poona, Jubbulpore, Bombay, Khandesh, Gadak, Dharwar, Hubli, Bangalore, Mysore, Kampti, Madras, Cuddapah, Rajahmundry, and other places in Northern and Central India. At the present time the demand for them has altogether ceased owing to the severe distress that exists. The current prices of carpets in the local market barely cover the cost of the twist used, and leave absolutely no margin for even the cost of labour. Generally, one bundle of carpets containing eight pieces was sold for Rs.8, whereas each bundle does not now fetch more than Rs.4 or Rs.5 at the most; and, owing to this fall in prices, bundles of carpets worth about Rs.20,000 are lying idle in the shops in the town. Besides the looms for carpet-weaving, there are other looms in the town, where different kinds of cloths are woven. The looms afford occupation to Muhammadans, mostly *gosha* females, who cannot do any other work than weaving, and the closing of the looms means loss of occupation and livelihood to a very large number of weavers, reported to be about four thousand.

A scheme for the relief of the weavers has been sanctioned, the carpets selected for manufacture being only such kinds as would find a ready local sale in ordinary times.

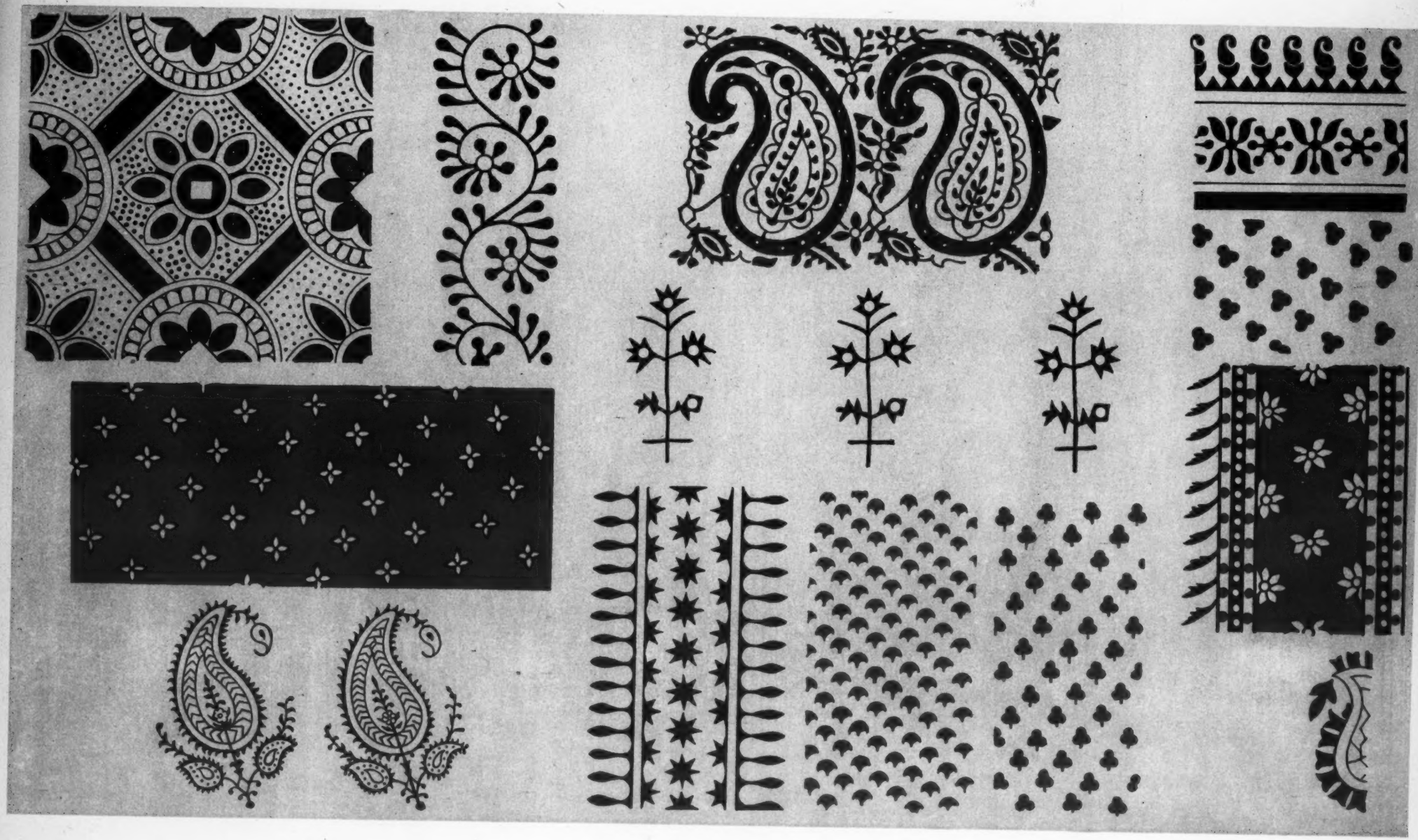
Samples of carpets (*patti* and *chedasti*) sent to me for inspection were less elaborate in design than those manufactured at Adoni, the patterns consisting of alternate stripes of blue and white, blue and red, or two shades of blue.

(*To be continued*).

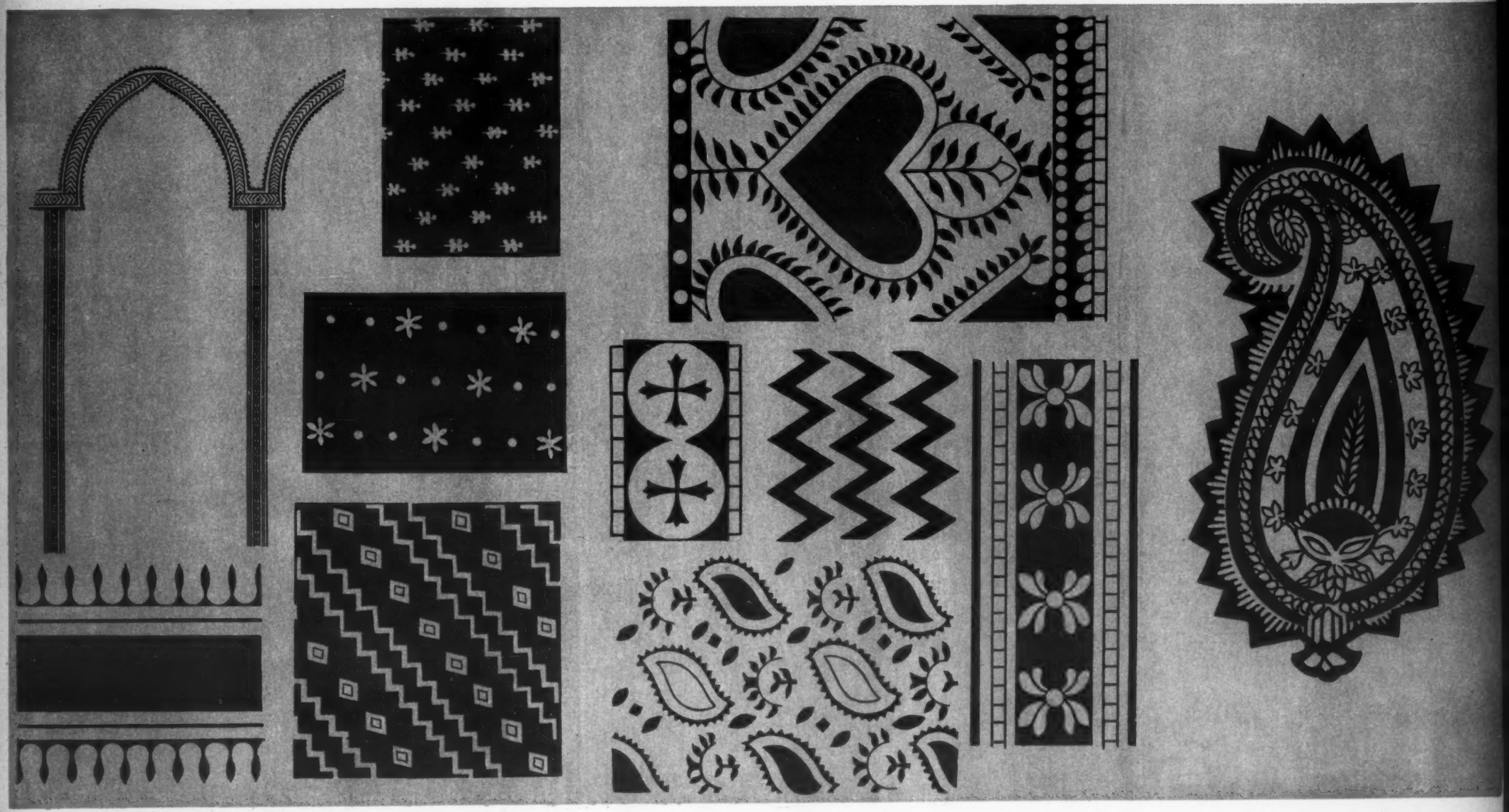
LIST OF ILLUSTRATIONS.

DYES AND DYEING IN BENGAL.—76 to 79.—Stamped Patterns. 80.—Dyers and Printer at work. THE COTTON FABRIC INDUSTRY OF THE MADRAS PRESIDENCY.—81 to 88.—Arcot Wood Blocks.

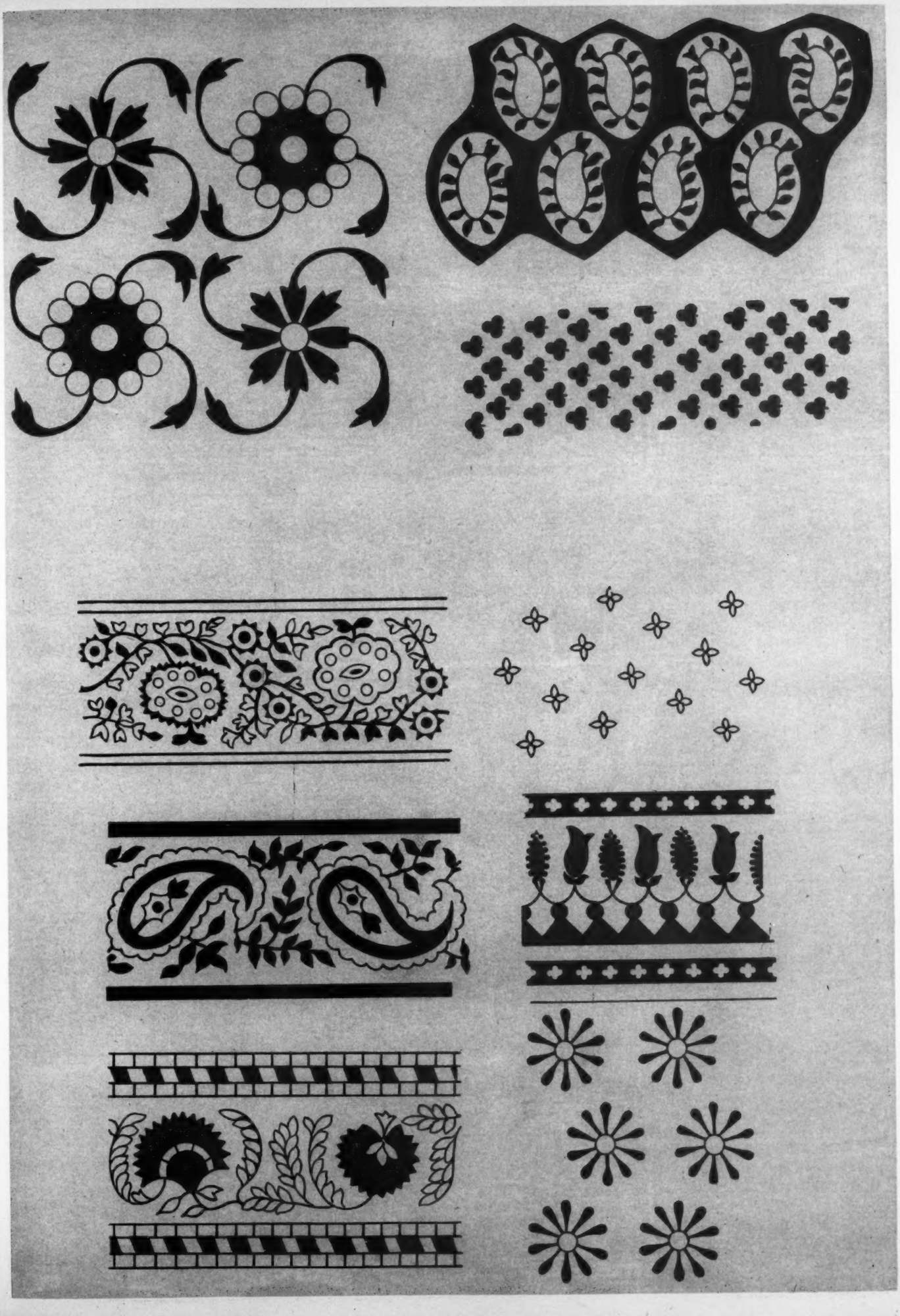
76.—Stamped Patterns.



77.—Stamped Patterns.



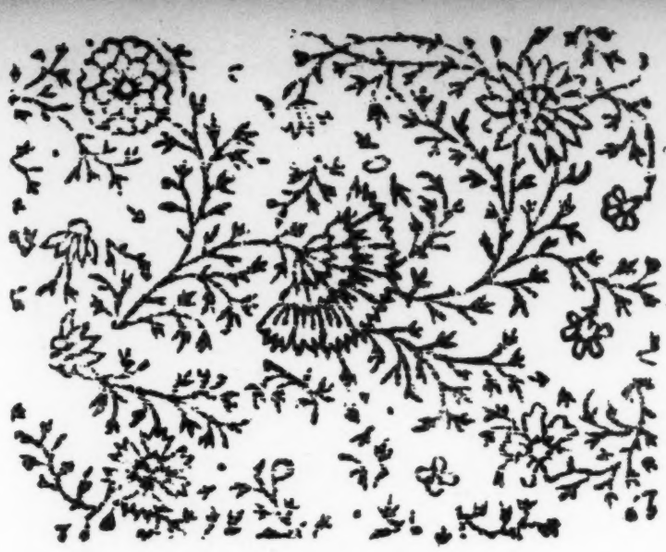
78.—Stamped Patterns.

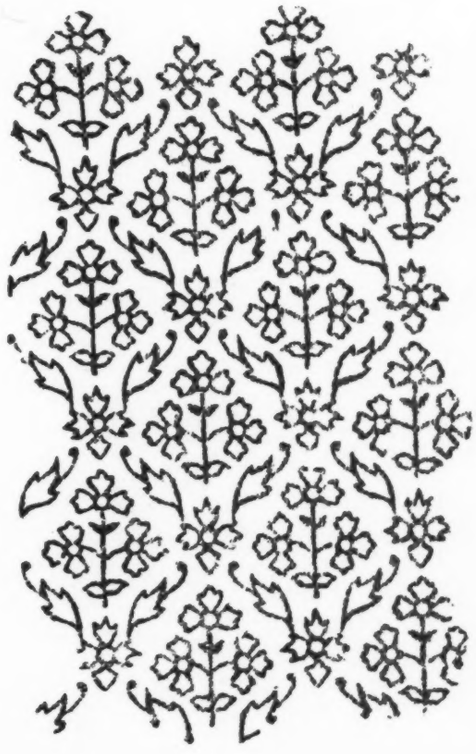


79.—Stamped Patterns.

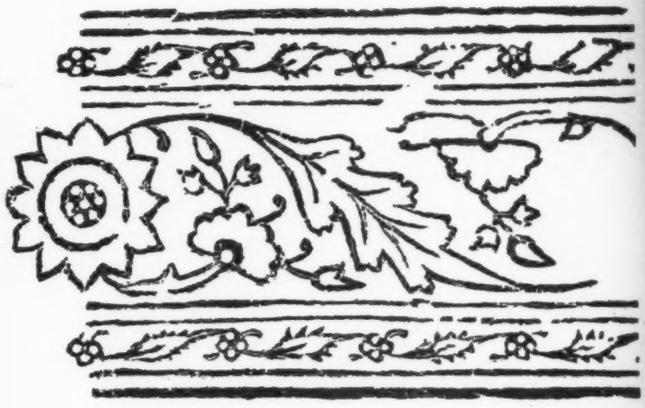
DYEING AND DYERS AT WORK.

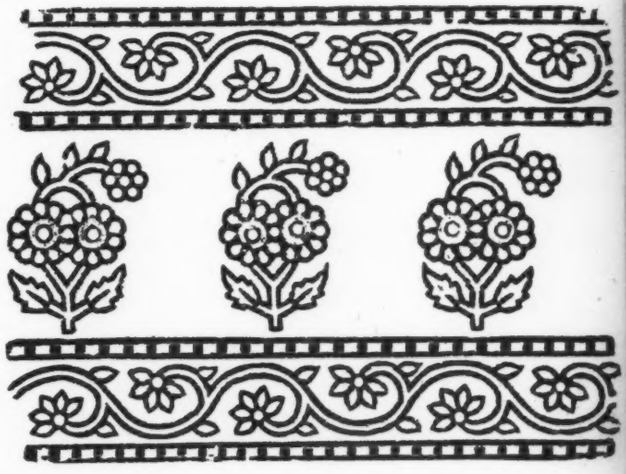
80.—PRINTING AND PRINTER AT WORK.

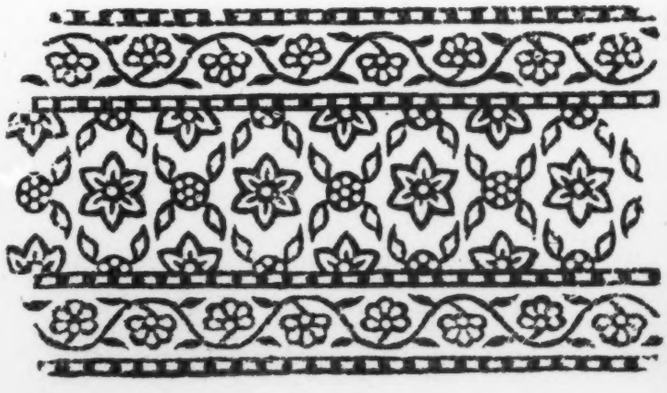




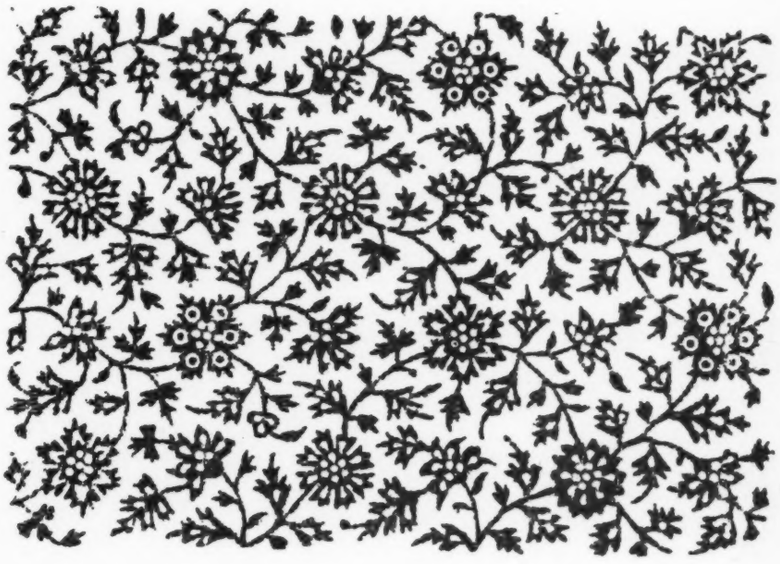
81.—Arcot Wood Blocks.

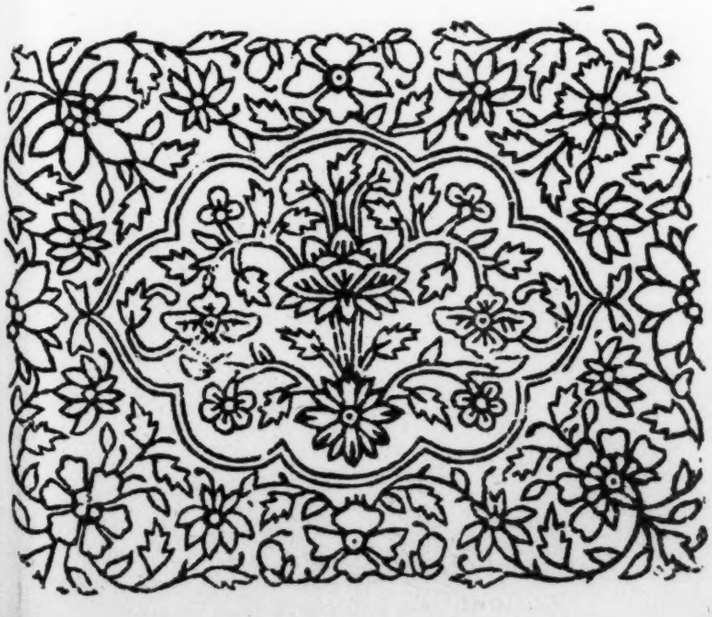




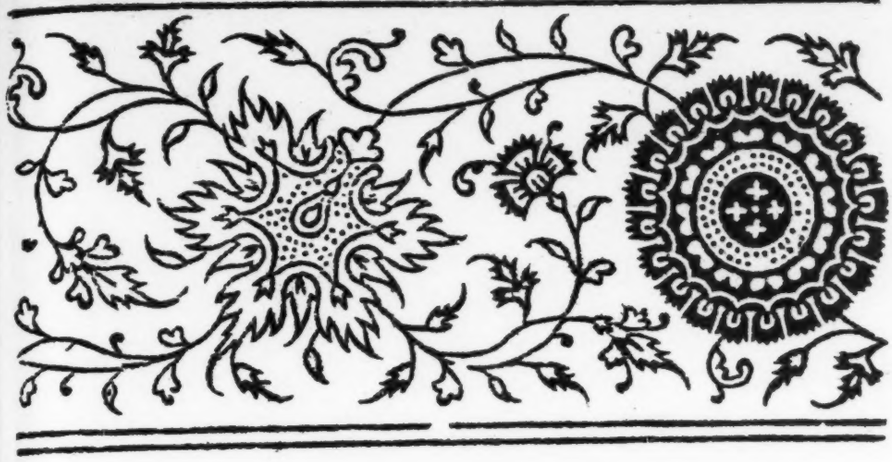


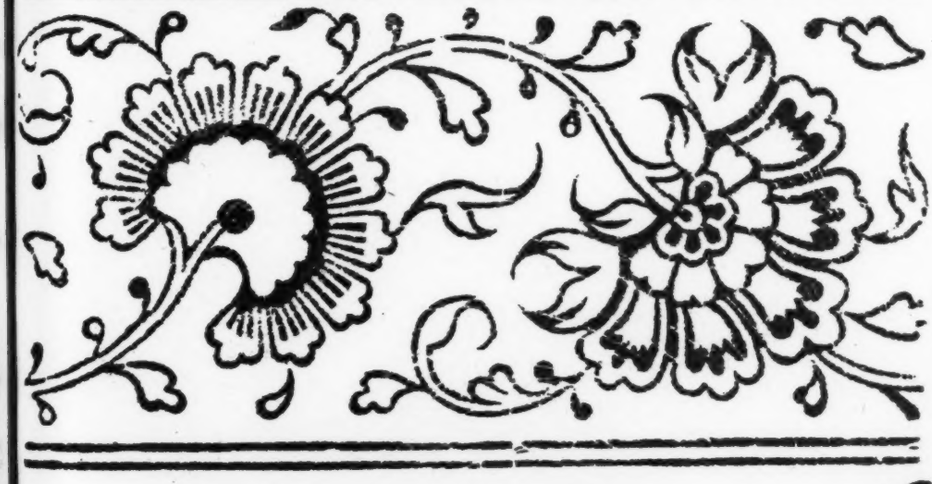
82.—Arcot Wood Blocks.

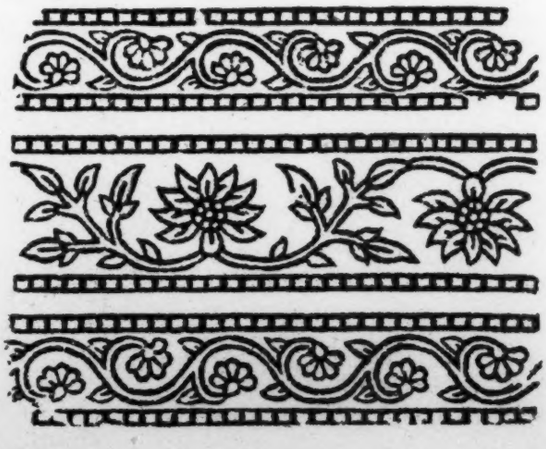




83.—Arcot Wood Blocks.

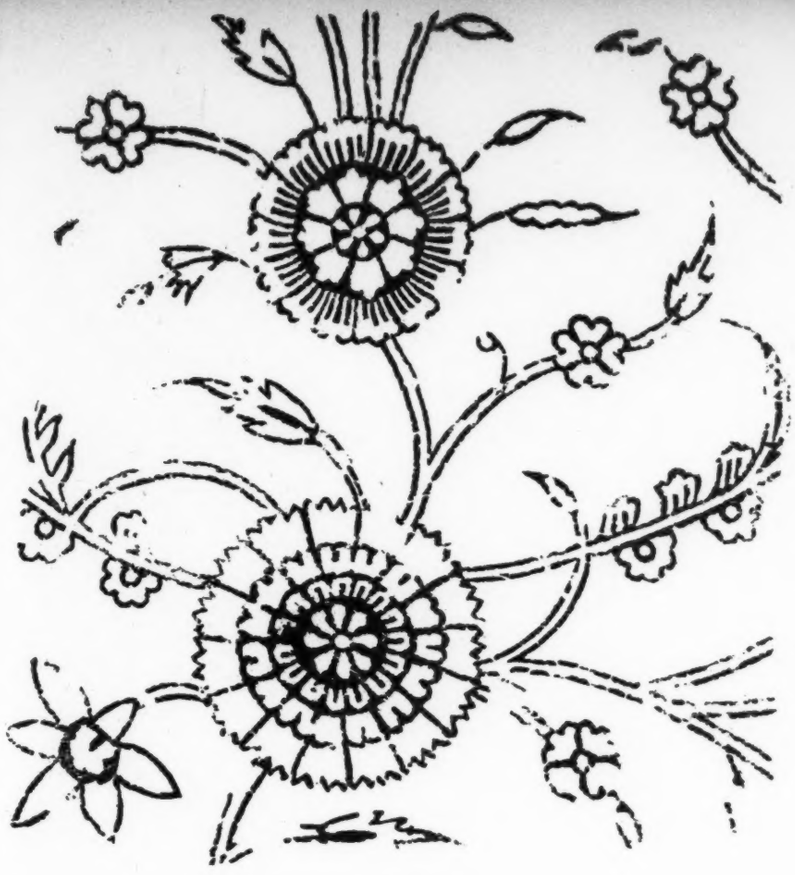


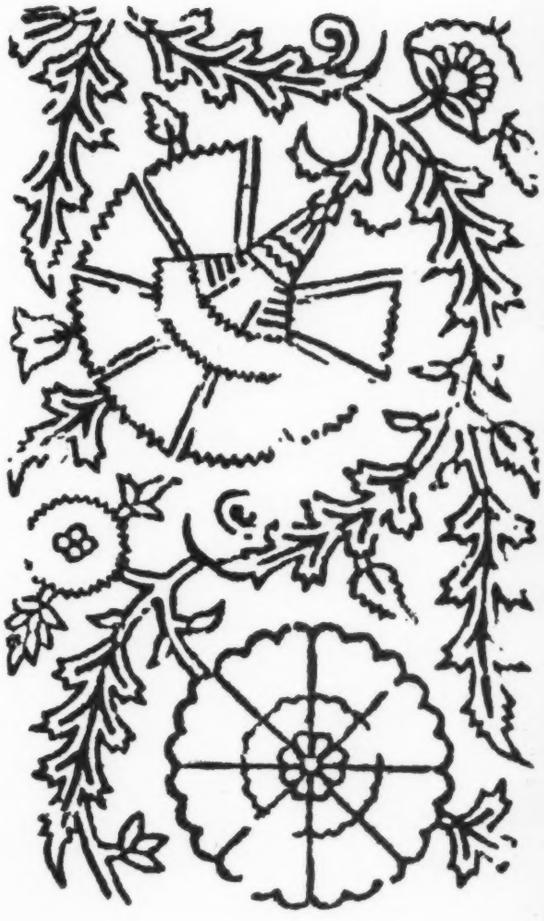




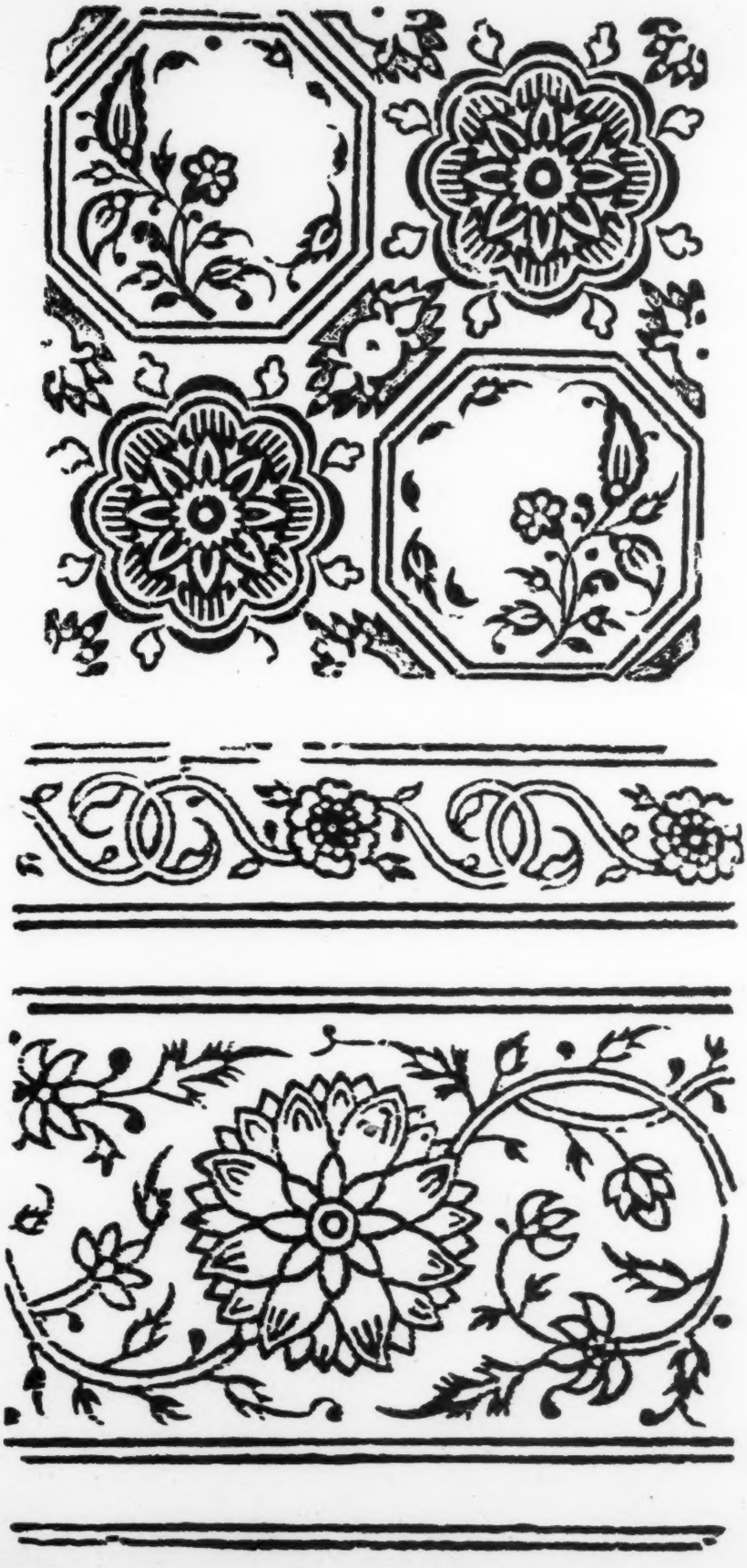
84.—Arcot Wood Blocks.

85.—Arcot Wood Blocks.

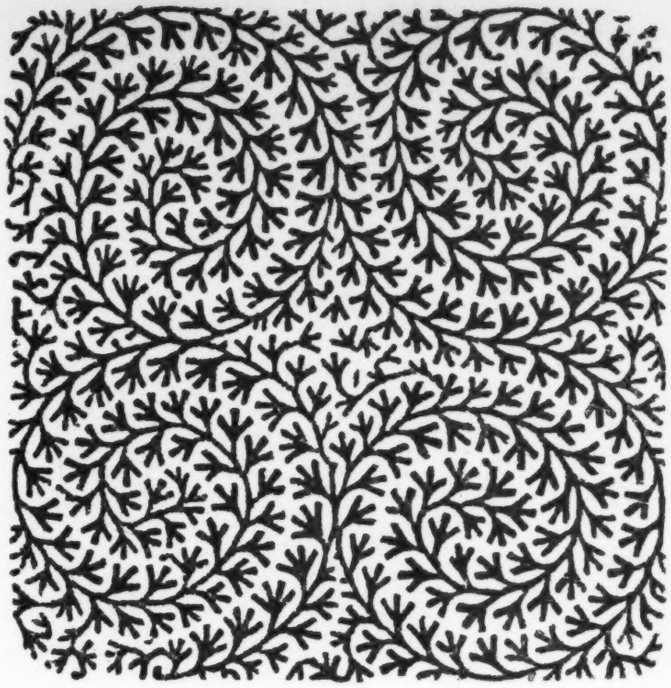




86.—Arcot Wood Blocks.



87.—Arcot Wood Blocks.



88.—Arcot Wood Blocks.

The Journal of Indian Art and Industry.

CASKET PRESENTED TO LORD HARRIS.

H.E. Lord Harris was entertained on the 14th February, 1895, at the end of his term of office as Governor of Bombay, and on the eve of his departure for England, by the members of the Byculla Club, who presented his Lordship with an address engraved on a gold plate.

The gold plate formed one of the inner faces of a carved ebony and ivory folding tablet, made after the fashion of an old diptych. This folded tablet was placed between two small *kinkab* cushions within a silver casket.

The engraved gold plate was enamelled at Jeypore by Goma Singh and Behari Singh (Plate 89); the three other faces of the tablet (two of ebony and one of ebony and ivory) were executed by Narottam Narayandas, the teacher of wood-carving in the Reay Art Workshops of the Bombay School of Art (Plates 89 and 90). The dimensions of the tablet when folded were 15 in. by 5½ in. by 1¾ in.

The silver casket which contained the tablet was also made at the Reay Art Workshops by Ranchor Meghjee, the teacher of gold and silver work. Its dimensions were 16 in. by 8½ in. by 6½ in. (Plate 91).

The casket was lined with *kinkab*. Two silk tassels, with lace fringe, fashioned on each side of the tablet, were used for lifting it in and out of the casket. A cover for the casket was made of white plush on one side and crimson velvet on the other, with gold fringe, tape and buttons.

LIST OF ILLUSTRATIONS.

89.—Inner faces of folding tablet, with the gold enamelled plate, upon which was engraved the Address, presented by the members of the Byculla Club, Bombay, to Lord Harris.

90.—Outer faces of folding tablet in carved ivory and ebony.

91.—Silver casket containing the Address presented to Lord Harris.

THE COTTON FABRIC INDUSTRY OF THE MADRAS PRESIDENCY.

By Mr. EDGAR THURSTON, Superintendent, Madras Government Museum.

(Continued from p. 24).

As bearing on the subject of native cotton carpet manufacture in the Madras Presidency, I reproduce the notes on cotton carpets of jail manufacture, with which I have been favoured by the Superintendents of the Salem, Tanjore, and Vellore Jails.

Salem Jail.—The manufacture of cotton carpets or *jamkalams* was first introduced in 1892. The industry was started on a small scale, with one or two looms, and two or three patterns of plain striped carpets were woven. Through the exertions of the then Superintendent of the Jail, Mr. J. E. Young, carpets were sent round to friends and others for inspection, with a view to orders for such work being canvassed. The demand being fair, and suggestions for improvement and development having been received, an outside professional was obtained. The number of looms was, at the same time, increased; new and varied patterns, both plain and flowered, were devised, and the industry showed marked signs of future development. Samples were sent to England, whence orders for large numbers were received from English firms. At the same time the Commissariat Department was addressed, and orders for soldiers' carpets and bed-side rugs for hospitals were received and successfully complied with. The number of looms had to be still further increased to ensure punctual supplies to the Military Department.

The usual sizes of cotton carpets are 6 ft. by 3 ft. and 8 ft. by 5 ft. Carpets and rugs for the Military Department are generally 6 ft. by 3 ft. and 4 ft. by 2 ft. Tent carpets, ranging in size from 10 ft. to 14 ft. square, are also manufactured. The price of carpets of the ordinary pattern is ₨ 1-4-0 per square yard, rising to ₨ 2 per square yard, according to workmanship, pattern, and quality.

The demand for carpets locally is fair, though to a certain extent natives—especially those who are unable to appreciate good shades and fast dyes—prefer the cheaper bazaar carpets. The monthly average sale of carpets for the past three years has been Rs 163 - 14 - 10.

The principal colours used are blue, red, green, yellow, black, brown, *káki*, and maroon. The vegetable ingredients from which the several dyes are obtained are usually as follows:—Blue, indigo; red, logwood and lac; green, turmeric and indigo; yellow, turmeric and *moorookamboo* (flowers of *Butea frondosa*); black, indigo and gall-nuts; maroon, lac.

About twenty looms are now employed. New hands are instructed by convict overseers, who are specially selected from among men who have done thoroughly well in their work. At the same time, long-term convicts are trained, and the warder in charge of the workshop is sometimes capable of teaching the men in his charge.

TANJORE JAIL.—From 1890 a small beginning was made with cotton carpet-weaving of dyed twist obtained locally and from the dye-works, Bombay. The outturn was not much, but sufficient to meet the demands of the local hospitals. Gradually the demand increased; extra looms were erected; new patterns introduced; and a large quantity of English-dyed twist was consumed in the manufacture. The residents of the district in particular were large buyers, and, year after year, the demand has been increasing. Ten looms are daily in work, and about twenty convicts are employed on the manufacture. The carpets are made of different widths, varying from 3 ft. to 12 ft., and are sold at Rs. 1 - 4 - 0 and Rs. 1 - 12 - 0 per square yard. Unlike the Vellore Jail carpets, those made in this jail are a little coarser. The patterns vary, and, as the natives of India proper prefer bright and gaudy patterns, a good deal of gold, green, yellow, orange, lemon, purple, blue, and other colours are utilised in the carpets. With the exception of green, lemon, orange, chrome, and Turkey-red, which are purchased from merchants, and are made in Europe, all the colours are dyed in India with vegetable dyes. The weaving is very simple, and it never takes a convict more than a few months to learn the work. A convict overseer, who is himself a good workman, instructs beginners. Generally, beginners are first put to coarse carpets made of 10's twist, white and coloured; after a few months' practice, to finer quality carpets, in which No. 20's twist is principally utilised; and, in the third and subsequent months, to the finest quality carpets. The carpets are woven on ordinary country looms.

VELLORE JAIL.—Cotton carpets have been manufactured since 1881. They consist of three varieties, termed ordinary, superior, and tent carpets. In the ordinary ones, the pattern is of a simple nature, usually consisting of stripes of various colours artistically arranged; while, in the superior ones, the texture is finer, and the design more elaborate. These carpets vary in size, but are usually made from 6 ft. to 7 ft. long and 3 ft. to 4 ft. broad. Tent carpets are plainer than the ordinary ones, and usually consist of stripes of two colours running at right angles to the warp. They are, of course, much larger than any of the other varieties, being made to fit the tents, for which they are intended. The usual sizes are 10 ft., 12 ft., and 14 ft. square. The ordinary carpets are priced at Rs. 1 - 8 - 0, and the superior ones at Rs. 2 - 4 - 0 per square yard, while the tent carpets are sold at Rs. 1 - 4 - 0 per square yard.

The supply is equal to the demand. People prefer purchasing in the jail, where they are sold at a higher rate, being superior in quality to those sold in the local market. As the last-named variety is mainly used for tents, the demand is still greater.

The dyes used in the manufacture of the cotton carpets are as follows:—Blue, indigo; brown, catechu and logwood; green, indigo and the flowers of *Erythrina indica*; yellow, flowers of *Erythrina indica* and turmeric; light green, sulphate of copper and lime-water; black, sulphate of iron and gall-nuts.

The number of looms usually at work is ten. The looms employed are the ordinary pit-looms, the weaver sitting on a level with the ground with his feet in the pit. In cases where the carpet to be woven is a broad one, two, three, four, and sometimes five men have to sit abreast at the same loom. The weavers are instructed by the older hands and by the work overseers.

No share of the proceeds is, I am informed, credited to the convict weavers.

CONJEEVERAM WEAVERS.—Mr. J. D. Rees ("Twelfth Tour of Lord Connemara," 1890) writes as follows:—"The town has for ages been the head-quarters of a large community of weavers, who have of late suffered grievously owing to the competition of Manchester goods. Coarse country cloths, however, are still manufactured. Weaving operations are, for the most part, carried on in the open air, either in the broad streets, or preferably under shady groves of tamarind trees, which abound in and about the town. As you enter a weaver's grove, it appears at first sight as if those occupied in this industry were engaged in a pretty game. Rows of women walk up and down the shady aisles, each holding aloft in the left hand a spindle, and in the right a bamboo wand, through a hook at the end of which the thread is passed. Alongside are split bamboos reaching as high as their hips, and, as they pass, they unwind the thread from the spindle by means of the wand, and pass it over each

alternate upright. The threads, thus separated, are subsequently lifted with their bamboo uprights from the ground, and, while extended from tree to tree in a horizontal position, are washed with rice-water, and carefully brushed. The threads are now ready to be made into cloth, and the actual weaving is carried on by means of primitive hand-looms inside the houses. In this manner are manufactured men and women's ordinary clothing, as well as the red handkerchiefs dear to the Tamil man, which he takes with him to Singapore, or any other distant place, to which he may migrate." (This account describes what may be seen going on in weaving centres throughout Southern India).

VENKATAGIRI WEAVERS.—Their speciality is a plain white muslin fabric with red or gold-lace bands for turbans and body-clothing for males. The thread, gold-lace and red dye-stuff are imported from Europe. They only make fine qualities of muslin to the order of rich people. The present generation is not so prosperous as the last. There is still some demand for the muslin at distant places, such as Madras, Salem, Trichinopoly, and Kumbakonam. But the industry has declined owing to bazaar merchants selling imported mull, book-muslin, and colour-printed fabrics, which have the great advantage of cheapness. The people cannot at the present time afford to buy comparatively expensive clothing, as there has been a succession of years of scarcity, with consequent high price of food-grains. They have had to increase the price of their muslin, owing to rise in value of the imported thread and gold-lace.

Mr. Daday Khan, embroiderer, Madras City, has been in business about fifteen years. He learnt designing at his native school; and has gained prizes at various Exhibitions, Chicago, Indo-Colonial, &c. At Chicago there was a large demand for his work. He now has a considerable export business. His Indian business is almost entirely with Europeans, to whose requirements his manufactures are adapted. About fifty men are engaged in embroidery work at his shop, and, in addition, contract work is executed outside. He procures muslin from Arni, Cuddapah, Madura, and Dacca (Bengal), and considers Arni muslin of fine quality, made with country cotton, the best and strongest. Plenty of weavers are still engaged in the manufacture of coarse muslin, but the finer qualities now have to be made to order. The trade in the finer qualities has greatly declined, owing to the extensive introduction of muslins made in Europe, and they are only manufactured by very few families as compared with former days. He sends the fine muslins to Calcutta to be washed, as, if washed in Madras, they become hard and stiff. He considers that, for his purpose, imported mineral dyes are better than indigenous vegetable dyes, mainly on the ground of the expense of, and time lost in preparing the latter. He thoroughly understands the admixture of mineral dye powders so as to secure the requisite soft tints; and showed me a large number of samples of embroidered table cloths, table centres, mantel-piece borders, &c., which, in colour and design, were certainly excellent. Beetles, for green beetle wing ornamentation, are mainly procured from the Cuddapah district. He makes coarse gold and silver lace himself, but obtains gold lace of fine quality from France, as he found manufacturing it more expensive than purchasing it from Europe. (The imports of gold thread to the ports of Madras in 1895 were valued at Rs.1,660,533, and were obtained almost entirely from France).

The following extracts from the catalogue of Madras Exhibits at the Indo-Colonial Exhibition, 1886, to which typical examples were sent, will indicate the nature of Mr. Daday Khán's work so far as cotton fabrics are concerned :—

	RS.	A.	P.
Lady's dress in white net, embroidered in gold and beetle wings	75	0	0
Lady's dress in black net, embroidered in gold and beetle wings	55	0	0
Lady's dress in Arni muslin, embroidered in gold	70	0	0
Table cover in dark blue cloth, embroidered in gold and colours	18	0	0
Table cover in black cloth, embroidered in gold and colours	18	0	0
Table cover in red cotton, embroidered in white chain-stitch	2	8	0
Mantel border in black cloth, embroidered in gold and colours	15	0	0

A Madras City (Triplicane) weaver has six hand-looms at work. The only indigenous dyes which he uses are indigo and *surúl-pattai* (*Ventilago Madaraspatana*); he re-dyes European red-dyed yarn with the latter to obtain a dull red tint. In former days he used to make a good green with indigo, turmeric and alum. He now mainly uses yarn dyed in Europe, with which weaving operations can be commenced at once; whereas, the preparation of yarn dyed with indigenous vegetable dyes, will, in some cases, take six months. He does not use "tinned dyes," as the colours do not last, and to employ them would be cheating his customers. The colour of cloths made with country-dyed yarn would last till the cloth was, by long wear and repeated washing, torn to rags. He makes body-cloths for Hindu and Muhammadan women. A plain cloth will take three days to weave, an average cloth five days, and an elaborate one twenty days. The weavers employed by him are paid by the cloth, not by daily wage. They work on old patterns as a rule, but exceptionally make special patterns to order.

Another Triplicane weaver uses dyes of various colours obtained by mixing tinned dyes with native dyes. Native dyes are more expensive than mineral dyes, and great loss of time is incurred in their preparation. Native dyes are fast, whereas mineral dyes fade. He first partially dyes the fabric with native dye, and completes the dyeing process with mineral dyes, which give brilliancy. If a school of dyeing was started in Madras, he would come himself, and send his children to receive instruction there.

A Madras City (Saidápet) weaver employs about a hundred weavers, who are paid by the job. He manufactures Muhammadan women's cloths (*lungis*), which he sells wholesale and retail to agents from Palghat, Calicut, Tellicherry, Tinnevelly, and other places. With the exception of indigo-dyed yarn, yarns dyed in Europe are used and have been for many years.

The colours used, among which various tints of red predominate, are for the most part subdued, and the patterns of the cloths plain and simple. He admits the superiority of seruver dye, but says that good seruver dye cannot be made with the river or well water available at Saidápet. The water of Washermanpet (in the city of Madras) and of Conjeeveram, where cloths are largely manufactured, is well adapted for the manufacture of this dye. Shown two samples of yarn, one dyed a reddish-brown in Europe, the other dyed red in Europe and re-dyed with *surúl-pattai* in Madras, he distinguishes them by the fact that the latter is not so soft to the touch and of a dirtier hue, and by the difference in smell.

Another Saidápet weaver is engaged in preparing cotton cloths with *serinji* and mineral dyes, which he purchases in barrels. He says that the results produced with mineral dyes are not so good as those produced with native dyes, but the dyeing process is cheaper, and the dyed cloths look very well when new. He would use native dyes from preference, if their cost was less. Sells the cloths to a godown-keeper, who returns cloths which have faded while in stock to be re-dyed. If a school of dyeing was opened in Madras, he would be glad to come and learn, if possible, how to work native dyes by cheaper processes than the existing ones.

A Washermanpet weaver makes red cotton cloths, which he sells to merchants. He purchases European dyes in barrels. Dyeing with European dyes is a far cheaper and quicker process than dyeing with native dyes. The preparation of native dyes and dyeing yarn therewith may take many months. For some time there was no demand for cloths dyed with native dyes; but some demand is now arising, as it is found that cloths dyed with European dyes do not wear well, and the colour comes off the body when perspiring, and produces irritation of the skin. When shown some samples of mineral dyed cotton, manufactured by a firm in Germany, which has agents in Bombay, he said that they would not go down in the Madras market as they are too bright. If Government started a school of dyeing in Madras, he would be glad to go there himself and send his children to be trained there, if teaching was imparted how to use good coal-tar colours which are absolutely fast.

Before summing up the evidence here brought together as the result of examination of many witnesses at various dyeing and weaving centres, some account of the once celebrated printed cotton industry of Southern India and its present position is necessary. Technically, Indian cotton printed fabrics are (i) block-printed only, (ii) block-printed and hand-painted (or stained), (iii) hand-painted only. And I cannot do better than quote the words of Mr. Havell *(Journal of Indian Art)* based on his tour inspections of the industries of the Madras Presidency.

"The term palempore," he writes, "originally derived from the Hindustani 'palangposh' (a bed-cover) is now generally applied indiscriminately to all varieties of Indian printed or hand-painted cottons, including canopies, prayer-cloths or mats, handkerchiefs, and cloths for male and female wear. Indian cotton manufactures, and probably also printed cottons, have been known since time immemorial, though the original home of the latter industry seems to have been in Persia.

"The industry may be divided into two branches, the first including handkerchiefs and turbans, cloths for males and females (*dhutis* and *sáris*), bed-covers, canopies and prayer-cloths—all, with the exception of the last, being for strictly domestic use. The second embraces cloths of special manufacture, nearly always hand-painted, used as canopies over the images of Hindu gods, and at marriage or other ceremonies. They are also used to drape the car of the god in sacred processions. The different varieties in the first class of manufacture are used nearly exclusively by Muhammadans, though in the South of India the Muhammadans have assimilated many of the customs and habits of the Hindu; and the second kind, of course, is made for Hindus only. In the Madras Presidency, Masulipatam in the Kistna district, Palakollu, Gollapallem near Cocanada in the Godávari district, Nagore and Kumbakonam in the Tanjore district, and Permagudi and Pámban in the Madura district, are the chief places where the former kinds are made; while, for the other variety, Kálahasti in the North Arcot district, Salem, Palakollu, and Masulipatam are noted. The colours used in the printing are, in all cases, the same, though the whole of them are not always in use in one place.

"The palempores of Masulipatam have a wide fame. The kind usually seen at exhibitions are large cloths used as screens or canopies printed by hand, with conventional representations of trees (the Persian tree of life)

covered with flowers, parrots, peacocks, and other birds perched or flying among the branches. At the foot a river is sometimes flowing, or tigers and other wild beasts prowl round underneath the shade of the tree. But this is by no means the usual kind made. In fact, there are only three families existing now, who are capable of preparing them, and they are only made to order. On account of the tedious process of repeated boilings which the red colour requires, two months are required for the preparation of each cloth. The ordinary trade is in block-printed canopies, screens, and bed-covers, women's and men's cloths, and in the varieties which I have before classed as the first branch of the industry. Of these, the canopies and bed-covers are best known to Europeans; but many charming specimens of handkerchiefs, cloths, and prayer-mats, which are seldom seen except by those who go to the bazaars and purchase for themselves, are also made. The commoner cloths, with the patterns stamped only in red and black, show off the outline of the patterns to the most advantage; but the cloths which have partly coloured grounds generally please most by the delightful sparkle and brilliancy of the arrangement of colours, an effect for which the hand process is admirably adapted. The precision of outline is often lost, and the corners are often carelessly printed; but there can be little cause to wonder at these defects, when one considers the amount of hand labour involved (in the waxing before the application of the blue) in picking out elaborate patterns spread over five or six yards of cloth; and the whole result as representing perhaps two or three rupees, including the cost of the cloth. The original impressions of the block are by no means coarse or unfinished, as can be seen by reference to cloths with a white ground, to which the blue has not been applied. The blocks themselves are generally beautifully cut and finished with great minuteness and care.

"A distinct variety of palempores belonging to what I call the first class is made at Permagudi and Pámban. They are chiefly handkerchiefs and men's cloths for export to Burma, the Straits, and Arabian ports, and are noteworthy as being entirely hand-painted. The instrument, however, is somewhat finer than that used at other places, and the patterns are very delicate, having the appearance of embroidery. This is especially the case in an unfinished cloth with the first preparation of wax before it is soaked in the dye. The patterns are drawn directly on the cloths with the somewhat primitive apparatus described above, without the slightest hesitation or preparation, beyond a few lines roughly traced in charcoal to mark the divisions of the pattern. The red dye is remarkably deep and permanent, the Madura district being famous for the preparation of this particular colour. Similar cloths, but bolder and somewhat coarser in design, are made at Nagore and Kumbakonam, and at Karuppur in the Trichinopoly district. Block-printed palempores are also made at the first two places, but are only remarkable for their inferiority. Other places, in which block-printed palempores of the first variety are made, are Palakollu, Walajanagar in the North Arcot district, and Gollapallem near Cocanada, but their productions have no special merit or local character. At Saidápet, a suburb of Madras, block-printed cloths, with patterns of the same type as the tree of life described above, are made, and much good work may be found in some of them. The place best known for the second variety, or sacred palempores, is Kálahasti in the North Arcot district. Their best qualities are found in the rich and harmonious effects, which, at a suitable distance, the fine deep tones of the red, blue and yellow, present in contrast with the narrow strips of white ground on which the inscriptions are placed. The scenes represented are generally taken from the Hindu epics, the Máhabharata and Rámayana, the inscriptions being quotations from the same works. Far superior to these in drawing and graphic composition of the figures, and not less remarkable for colour, are those made at Palakollu in the Godávari district. They are generally on a white ground, and additional interest is given to the composition by the conventional landscapes, and by the palm trees and flowers serving as divisions to the groups of figures which illustrate the different incidents of the story. Only one man and his family occasionally make these to order. Other patterns made by the same man are of the tree of life type, the effect being somewhat heightened with gold leaf. These sacred palempores are also made to a limited extent at Masulipatam and at Salem, but in design there is nothing special to note with regard to them. Those of Salem are inferior in execution. The best productions of the latter place are in a variety of palempores generally used as canopies in religious processions. They are entirely hand-painted, and are generally good in design, colour, and execution; but the outturn by the two families who make them is so limited that it is not easy to procure good specimens. In design they are quite distinct from the palempores of any other place in the Madras Presidency."

A magnificent collection of block-printed and hand-painted palempores, such as will probably never again be brought together, was exhibited in the Madras section of the Indo-Colonial Exhibition, 1886. Of these, many were no doubt bought up, at the close of the exhibition, by the agents of British firms. A select number were, however, returned to Madras, and now form a conspicuous wall decoration in the art gallery of the Madras Museum. The most noticeable specimens in this unique collection were—

1. A palempore of Persian carpet pattern, exported largely to Persia, 18 ft. by 18 ft. Manufactured at Masulipatam, Rs. 60.

2. Canopy cloth with scenes from the Máhabharata, 6 ft. by 6 ft. Manufactured at Kálahasti, Rs. 12.
3. Canopy cloth with scenes from the Rámayana, 13 ft. by 11 ft. Manufactured at Kálahasti, Rs. 35.
4. Palempore with big lotus-flower pattern, in which the central design of a flower with fully expanded corolla calls to mind the lotus discs, which are so prominent a feature of the sculptures from the Amarávati stupa in the Kistna district. These sculptures, set up in the archæological section of the Madras Museum, should be, it may be noted *en passant*, but are not used as patterns for design in wood-carving or metal-ware, by those concerned in maintaining design at a high standard of excellence in Madras.
5. Palempores with bird and flower design, profusely decorated with gold-leaf. Manufactured at Palakollu, Rs. 300; Rs. 183.
6. Five so-called palempores from Manchester, imported for sale in Madras and Bengal, and exhibited to show the great deterioration of the pattern.

As a striking contrast to the Kálahasti canopy cloths, the Madras Museum possesses a cloth of similar type, with scenes from the Rámayana (manufactured, I believe, at Tadpatri), in which the artistic effect is ruined by the liberal use of hideous violet and green aniline dyes, which stand out in bad contrast with the indigenous red and blue vegetable dyes.

In the course of one of his industrial tours in the North Arcot district, Mr. Havell found at Walajanagar and Arcot, in nearly every house where block-printing was carried on, old blocks of very elaborate and beautiful designs, many of them of Persian origin, piled up in corners or in the roof, covered with dust, or, in some cases, cut in pieces and utilized for the patterns now in use, which are very poor and altogether inferior to the old ones. Of these splendid blocks, Mr. Havell managed to secure some two hundred, which, with others, now occupy an honoured place in the industrial section of the Madras Museum.

In the course of a conversation with a piece-goods merchant from the Madras bazaar, as a means of enforcing on him the wickedness of his samples of women's cloths of local or British manufacture, with crudely-executed design, and printed with red, yellow and green mineral dyes, I invited his attention to a series of prints of the Arcot blocks. The excellence of these he readily admitted, and he showed good taste in the selection of those which he considered to be good patterns. So much impressed was he, that he willingly took away a collection of prints from the best blocks with a view to having copies of them made in colours by his *moochee*.

At Ayyampet in the Tanjore district, block-printing in several colours has, of late years, been abandoned, and new blocks have actually been made in mimetic imitation of the design on imported British cloths with debased Persian pattern in black on a white ground, which are used as shawls by males. And the old wooden blocks and ingeniously constructed brass blocks are set aside as rubbish, buried amid dust and cobwebs.

The Rája of Kálahasti has in his possession a magnificent mythological hand-painted palempore, which is used on State occasions, and cost many hundreds of rupees. The Kálahasti cotton fabric painters, whom I recently interviewed, were at first afraid of me, suspecting that I was a commercial traveller on behalf of some firm, and had come among them with the base object of annexing their patterns for reproduction by machinery in Europe. They complained bitterly that British manufacturers are now copying patterns, which they and the Masulipatam block printers had turned out for many generations, and drew my attention to an imported cloth with debased Indian pink (*Dianthus*) device. A piece with similar device made at Kálahasti with vegetable dyes used to cost four rupees, whereas the British imitation, being machine-made with mineral dyes, can be sold at two rupees per piece. For shawls and handkerchiefs, block-printed in a single colour, they now resort to mineral dyes on account of their cheapness and easy preparation. For the hand-painted palempores and dados with mythological scenes from the Rámayana and Máhabharata, lotus and goose (*hansa*), or tree of life pattern, vegetable colours (indigo, seruver, manjisht, &c.) are still used with fine colour effect. The hand-painted canopy cloths are purchased more especially at the time of religious festivals, which take place periodically at Kálahasti; but the demand for them has greatly declined in recent years owing to the importation of British printed cloths, which are used as a cheap substitute for them. A cloth, which could formerly be disposed of for thirty to thirty-five rupees, has now to be sold for eight to ten rupees; and the workmen, who are very skilful artisans, cannot even earn four annas a day. The painting of a mythological cloth 15 ft. by 7 ft., costing twelve rupees, will take a month, and a very small margin of profit is left.

I feel convinced that, were the Kálahasti palempores brought more prominently to notice than is possible when they are buried away in the bazaars of Kálahasti, which is far removed from the track beaten by Europeans, who would be ready to purchase them at a price somewhat greater than the very modest one which is now current, a distinct impetus might be given to the industry, and the condition of the artisans improved.

The Government of India recently commended to the attention of the Government of Madras the resolution of the Lahore Art Conference, 1894, to the effect that "in all places at which there are distinct local industries,

small museums, or more correctly show-rooms, should be established, in which type-collections, illustrative of those industries should be placed and kept up. That they should be under the supervision of the local authorities, but be inspected periodically by the Superintendent of the provincial museum, without whose approval no objects should be kept permanently as types." My personal opinion in connection with this resolution is that no museum or show-room, however small, can flourish under amateur management, even if subject to the general control of a professional museum expert with power to make inspections, which must, of necessity, be few and far between. Moreover, the organisation of small local museums is no new idea so far as the Madras Presidency is concerned, but a scheme which has been put to the test and failed conspicuously. But I have often wondered that the Tanjore metal-workers, Trichinopoly pith-modellers, Kálahasti and Masulipatam palempore-makers, Ayyampet carpet-weavers, and others do not,—as is done in some of the big cities of Northern India and by the Adoni carpet-weavers—sell their wares, by arrangement with the railway companies, at the big railway stations, more especially in the cool season, when the itinerant "globe-trotter" is *en evidence*. The establishment of stalls on railway platforms, under some organised arrangement by which only the sale of recognised merit was permitted, would, it appears to me, be more practical and effective than museums or show-rooms, which might easily escape the attention of those for whom they are intended.

In his address to the Lahore Art Conference, Surgeon-Lieutenant-Colonel T. H. Hendley spoke as follows: "It is for us, gentlemen, to ascertain whether it is possible to try to teach both purchasers and producers to differentiate the good from the bad, and, if we cannot directly guide the dealers, at all events to see that our art schools and our museums only supply and purchase the best examples, and do all they can to discourage the sale of indifferent ones." These remarks, made with reference to the commercial aspect which Indian art has assumed, apply with equal force to the fast waning native cotton fabric industry of the Madras Presidency, both in its art and in its economic aspect.

Sufficient evidence has, I think, been brought together to prove that there is a marked deterioration and decline in the native dyeing and weaving industries, for which two primary factors are mainly responsible, viz., the importation of aniline and alizarine dyes, and of piece-goods, more especially cheap colour-printed fabrics.

The Lahore Art Conference summed up its views on the subject of mineral dyes in a resolution to the effect that "the Conference are of opinion that a serious danger threatens the Indian tinctorial industries through the rapidly increasing consumption of aniline dyes. It is felt that to check this evil involves many financial and political considerations, but that something might nevertheless be accomplished by Government in the desired direction. Some action might be taken, through the medium of local bodies, to show to dyers and others in what respect aniline dyes are harmful. It might also be desirable to issue a regulation prohibiting the introduction of carpets, calicoes, &c., into museums or exhibitions if coloured with these dyes. It is understood that they serve a certain useful purpose as cheap temporary dyes; otherwise the Conference would have preferred to recommend to the Government of India to totally prohibit their introduction into India."

Attacking the question of mineral dyes from a different stand-point, a Committee, appointed by Government in 1895 to enquire into the re-organisation of the Madras School of Arts and Industries, with myself as its secretary, summed up the results of its deliberations in connection with the dyeing of textile fabrics in the following terms:—"The Committee believe from the evidence before them that there is a distinct field for the establishment, in connection with the School of Arts and Industries, of a school of dyeing, printing and weaving, according to the most advanced knowledge of the time, and adapted for both employers and operatives. They believe further that the establishment of such a school might, by attracting the attention of capitalists, help to check the importation of cheap and vulgar European manufactures with debased Indian design. There appears to be every reason to believe that the classes would be largely attended from the commencement both by native dyers and their sons, and by Europeans, and it is within the knowledge of the Committee that one firm would send at least ten Europeans to receive instruction at the school. It would be necessary that the school should be completely equipped with dye-houses, chemical laboratory, &c., and that the staff should include a European dyeing expert to teach the theory and practice of dyeing. . . . . During the five years 1890 to 1895, 3,192,304 lbs. of aniline and alizarine dyes were imported into the Madras Presidency. These dyes are, in fact, so firmly established in the Indian market that no measure short of a prohibitive import duty can arrest their employment. It seems to the Committee that, even allowing that these dyes are to be utterly condemned from an æsthetic point of view, distinct practical good would result from educating the hitherto self-taught native dyers in the proper way of selecting and manipulating them, neither of which points they at present, from want of special training, understand. Quite apart, however, from the teaching of improved methods of dyeing with artificial dyes, one object of the school should be to try and improve the (at present) laborious process of manufacture of the indigenous vegetable dyes, for it is universally admitted by the native dyers that they only use the artificial dyes because they are cheap and quick in operation."

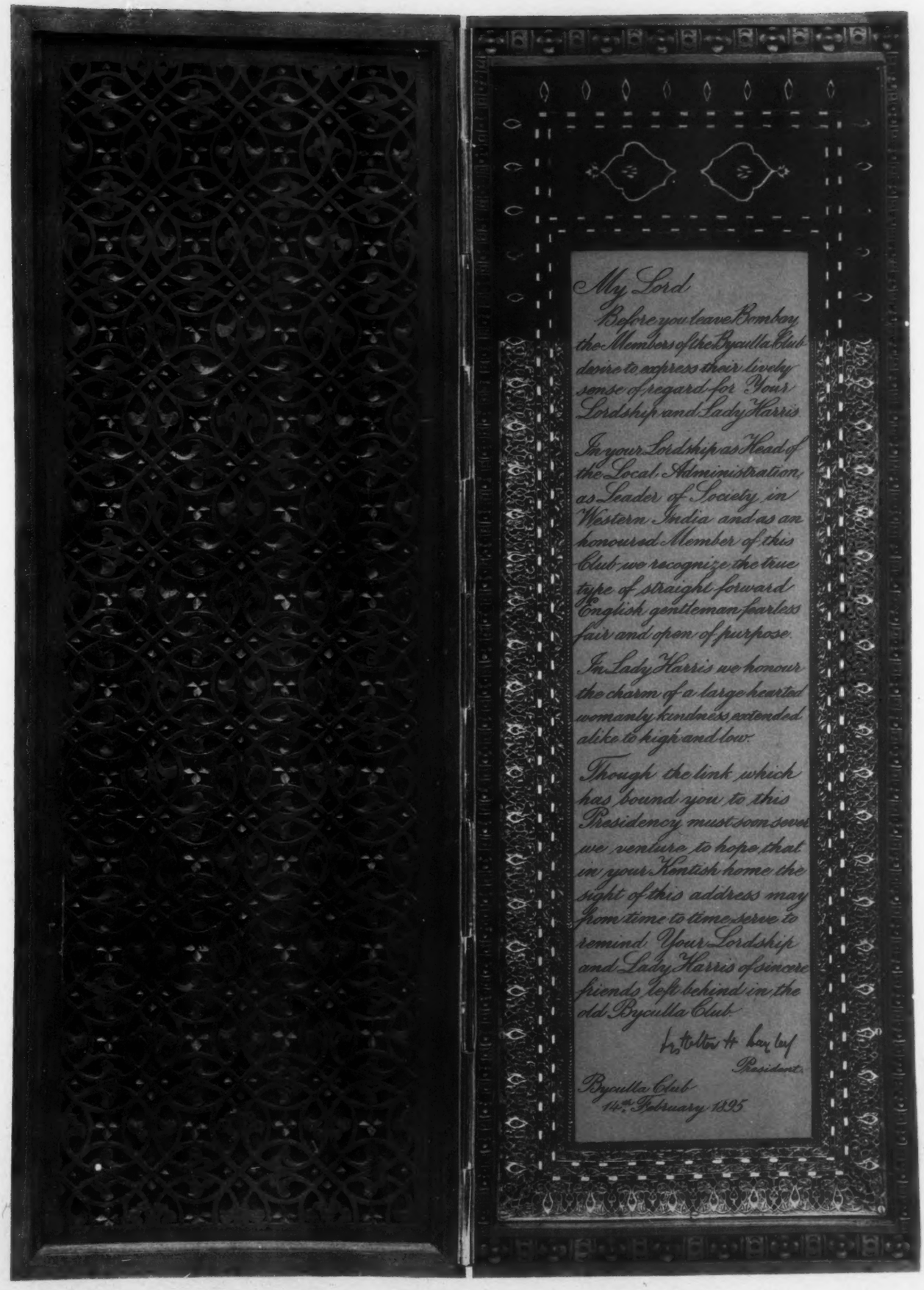
In a letter to a member of a Madras firm engaged in dyeing operations with mineral dyes, Professor Hummel, of the Leeds School of Dyeing, wrote to the following effect:—"I am much obliged for your offer of Indian dye-stuffs, but we are now able to obtain all we want from the Imperial Institute, and we are now engaged in making experiments with all that seem worth examining. I am not a believer in the superior excellency of Indian dye-stuffs. *Properly selected* coal-tar colours are far better in every way." The recent experiments of Professor Hummel and Mr. Perkin in connection with *ál* or *noona* (*morinda*) dye may be referred to as an example of the discovery, by laboratory research, of an improved system of using a dye principle as compared with the more clumsy system in vogue among the self-trained native dyers. And the practical value of these experiments affords an argument in favour of the establishment of a School of Dyeing in Madras.

Possibly long familiarity with, and study of Indian vegetable colours, and a tendency to regard them through Indian spectacles, may be responsible for biassing me in their favour, but I join issue with those who consider them, from a purely colour point of view, as inferior to coal-tar dyes. At the same time I fully appreciate the various advantages of cheapness, quick outturn, &c., which accrue from the use of aniline and alizarine dyes, and the impossibility of eradicating them, now that they are firmly established in the great Indian markets. With the native women's cloths, woven with yarns dyed in Europe with aniline and alizarine colours, there is really but little fault to find. The original patterns are still adhered to, and the blending of the colours is often skilfully carried out by those native weavers who use judiciously-selected imported yarns. But I protest emphatically against many of the colours used in the manufacture of woven and printed fabrics by native artisans, who use badly-selected dyes, which they purchase in tins or barrels. And I maintain that some action should be taken to improve both design and colour of many of the imported colour-printed fabrics, which one can only wonder that any civilised individual is willing to place on the market. If no action is taken in the immediate future, it is, as Mr. Havell writes (*Journal of Indian Art*, 1890), "obvious that, in no very short time, the whole of the native industry in the low-caste or purely cotton cloths must give way, and only a remnant of the finer manufacture, in which silk is partially or wholly used, will be able to hold its own to any extent against the cheaper, though vastly inferior in every way, European goods."

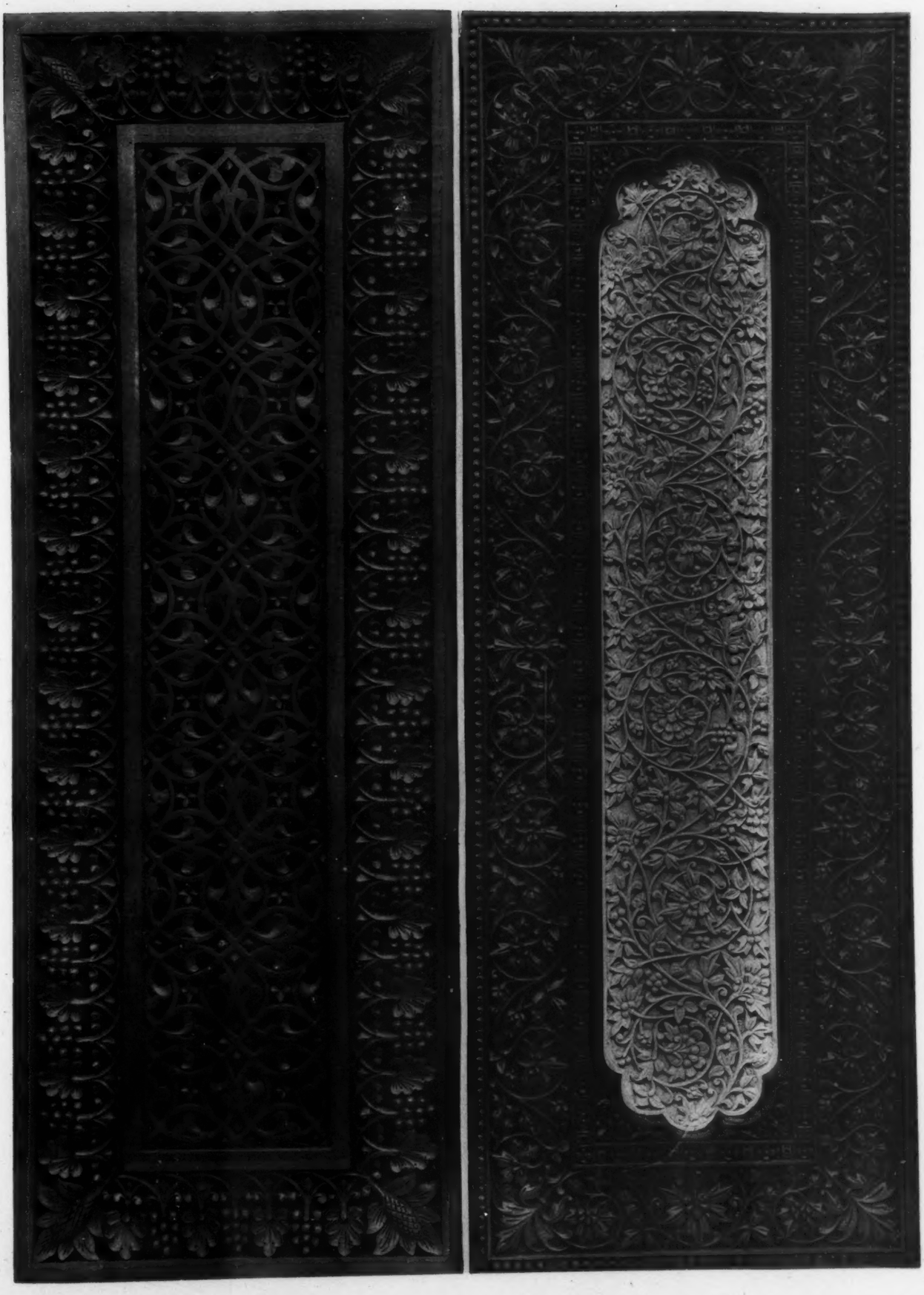
Admitting the hopelessness of any attempt to entirely arrest the importation of these goods, it nevertheless seems to me that the Madras Government School of Arts might, with a change of policy, prove a great influence for good, and that it should take an active lead in a serious effort to bring about an improvement in the colour and design of imported printed fabrics, and an amelioration of the condition of the native weavers and dyers, who, as hereditary artisans, are worthy of our sympathy and support. State interference with existing trade concerns is, I am fully aware, not wholly unattended with difficulties, to overcome which would require very careful steering by one gifted with tact, and able to win the confidence of the commercial community (European and Native) interested in the piece-goods trade. Ample material is available as a guide to the production of suitable design and colour in their relation to cotton fabrics for native wear; and an earnest effort should, it seems to me, be made by the School of Arts and Industries to check at least the production of the most glaring barbarisms in colour-printed fabrics, by the preparation and wide-spread distribution of patterns, carefully selected as regards colour and design, with a view to guiding both the designers and the manufacturers into a better path.

LIST OF ILLUSTRATIONS.

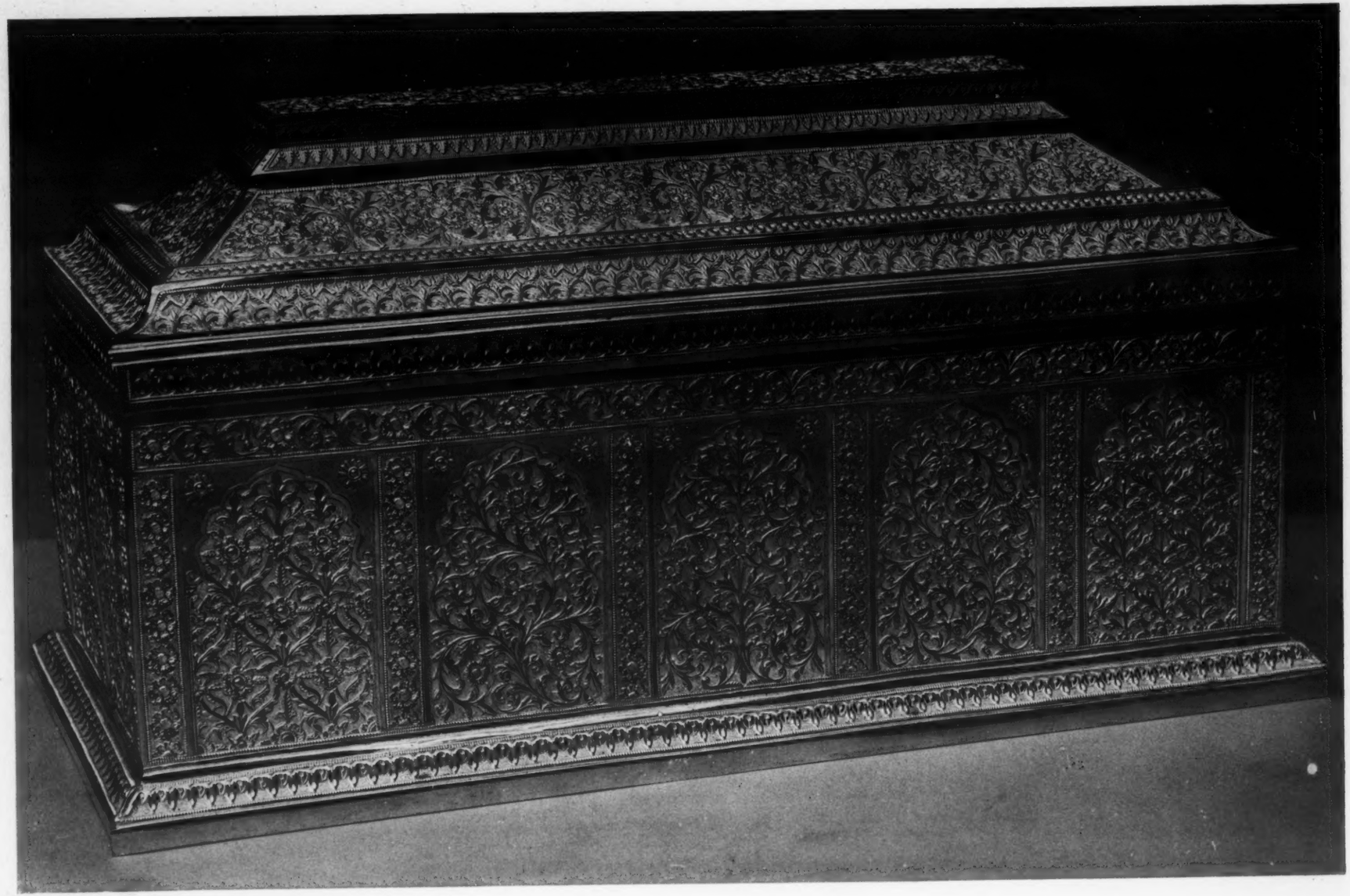
Nos. 92 to 98.—Seven plates of fourteen examples of Cotton Prints.


My Lord
Before you leave Bombay, the Members of the Byculla Club desire to express their lively sense of regard for Your Lordship and Lady Harris
In your Lordship as Head of the Local Administration, as Leader of Society in Western India and as an honoured Member of this Club we recognize the true type of straight forward English gentleman fearless fair and open of purpose.
In Lady Harris we honour the charm of a large hearted womanly kindness extended alike to high and low.
Though the link which has bound you to this Presidency must soon sever we venture to hope that in your Kentish home the sight of this address may from time to time serve to remind Your Lordship and Lady Harris of sincere friends left behind in the old Byculla Club.
President.
Byculla Club
14th February 1895

89.—INNER FACES OF FOLDING TABLET, with the gold enamelled plate, upon which was engraved the Address, presented by the Members of the Byculla Club, Bombay, to Lord Harris.



90.—Outer Faces of Folding Tablet, in carved ivory and ebony.



91.—SILVER CASKET containing the Address presented to Lord Harris.

15

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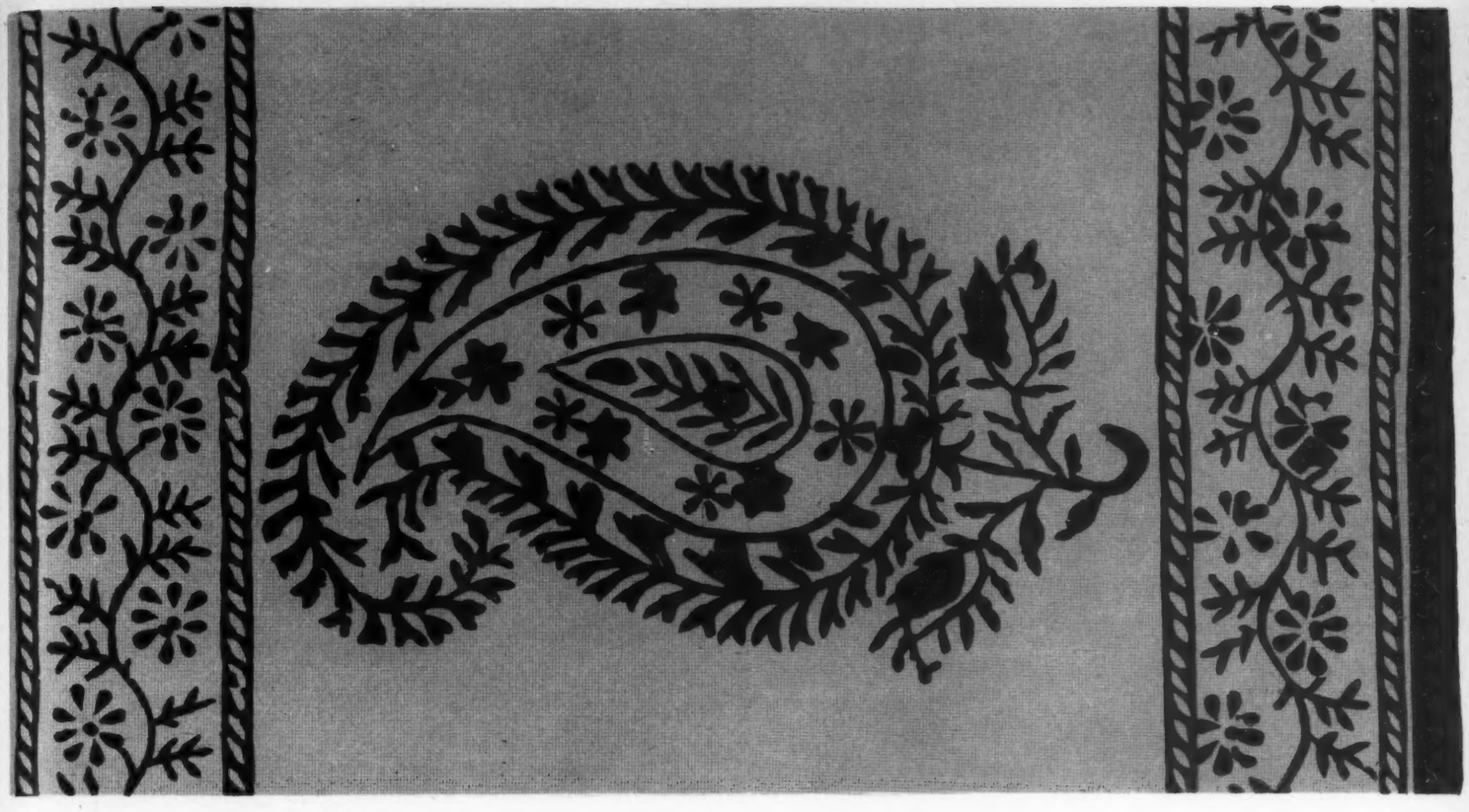
92 (1, 2, 15).—IMPORTED COLOUR-PRINTED FABRICS.

"Of these printed fabrics I submit samples taken at random from a large collection which has been examined by me for the information of Government, as proof that my condemnation is not unjust."—E.T.

8



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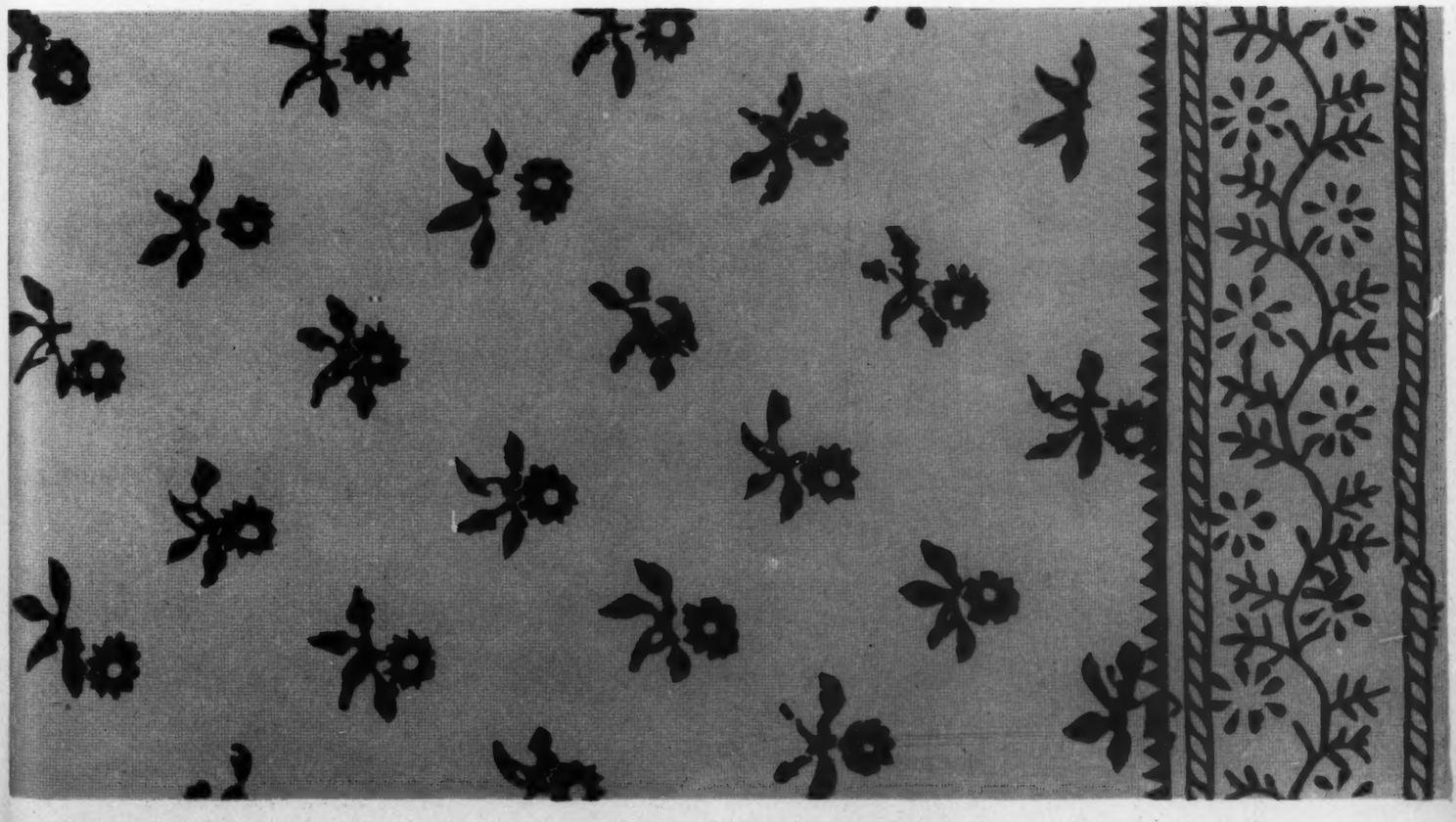

93 (8, 9).—IMPORTED COLOUR-PRINTED FABRICS.

"Of these printed fabrics I submit samples taken at random from a large collection which has been examined by me, for the information of Government, as proof that my condemnation is not unjust."—E.T.

94 (13, 14, 17).—IMPORTED COLOUR-PRINTED FABRICS.

"Of these printed fabrics I submit samples taken at random from a large collection which has been examined by me, for the information of Government, as proof that my condemnation is not unjust."—E.T.

17

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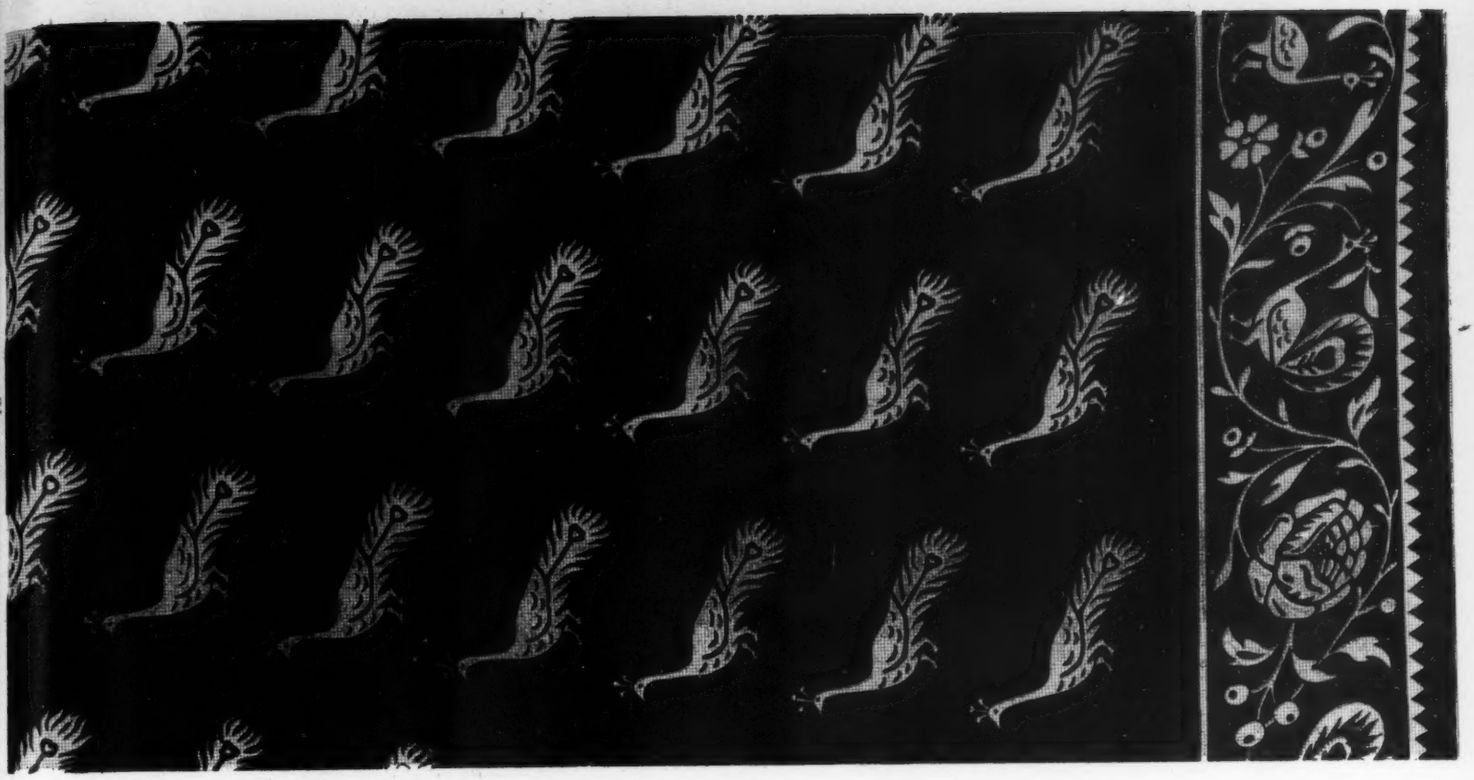
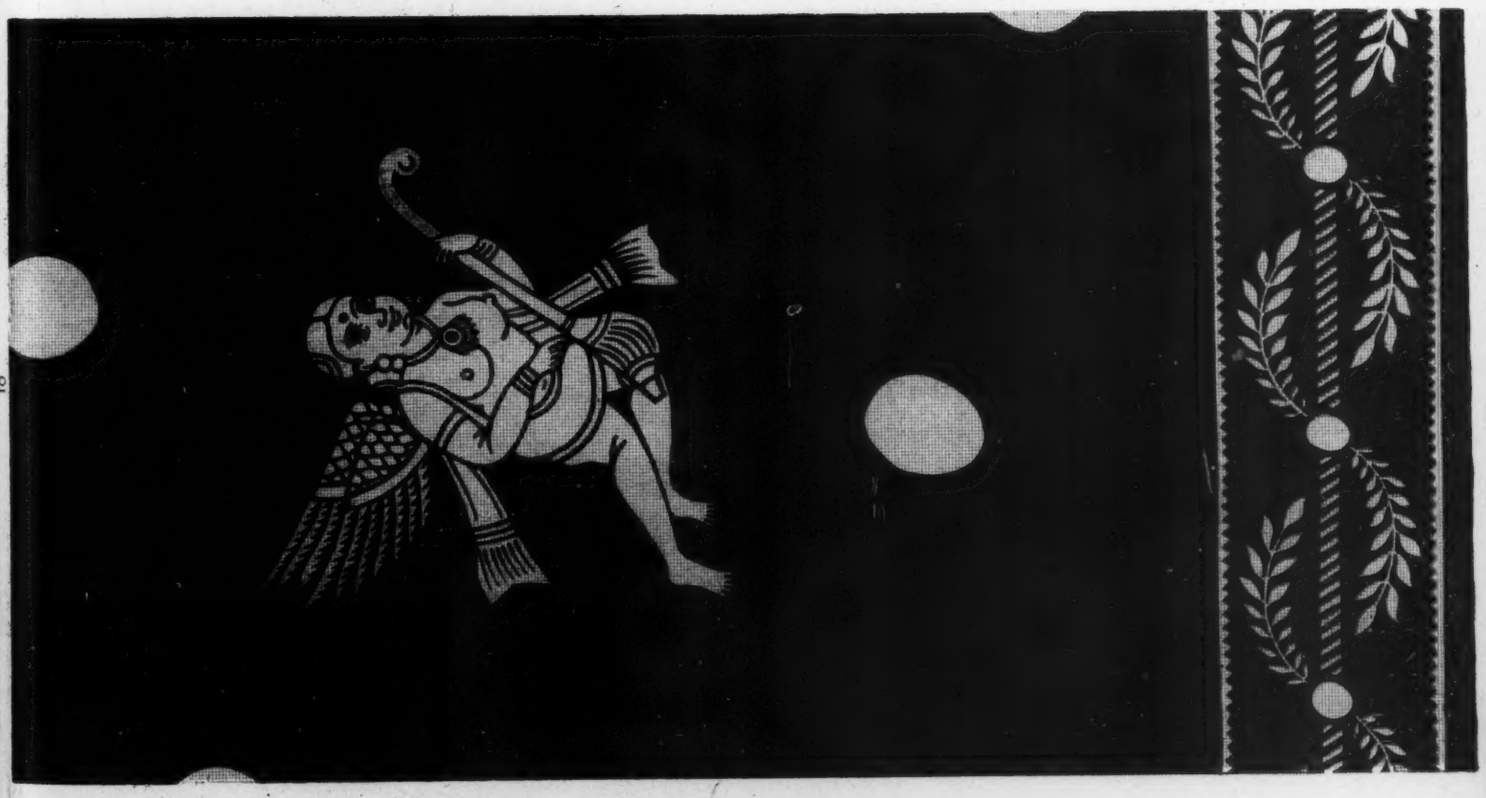
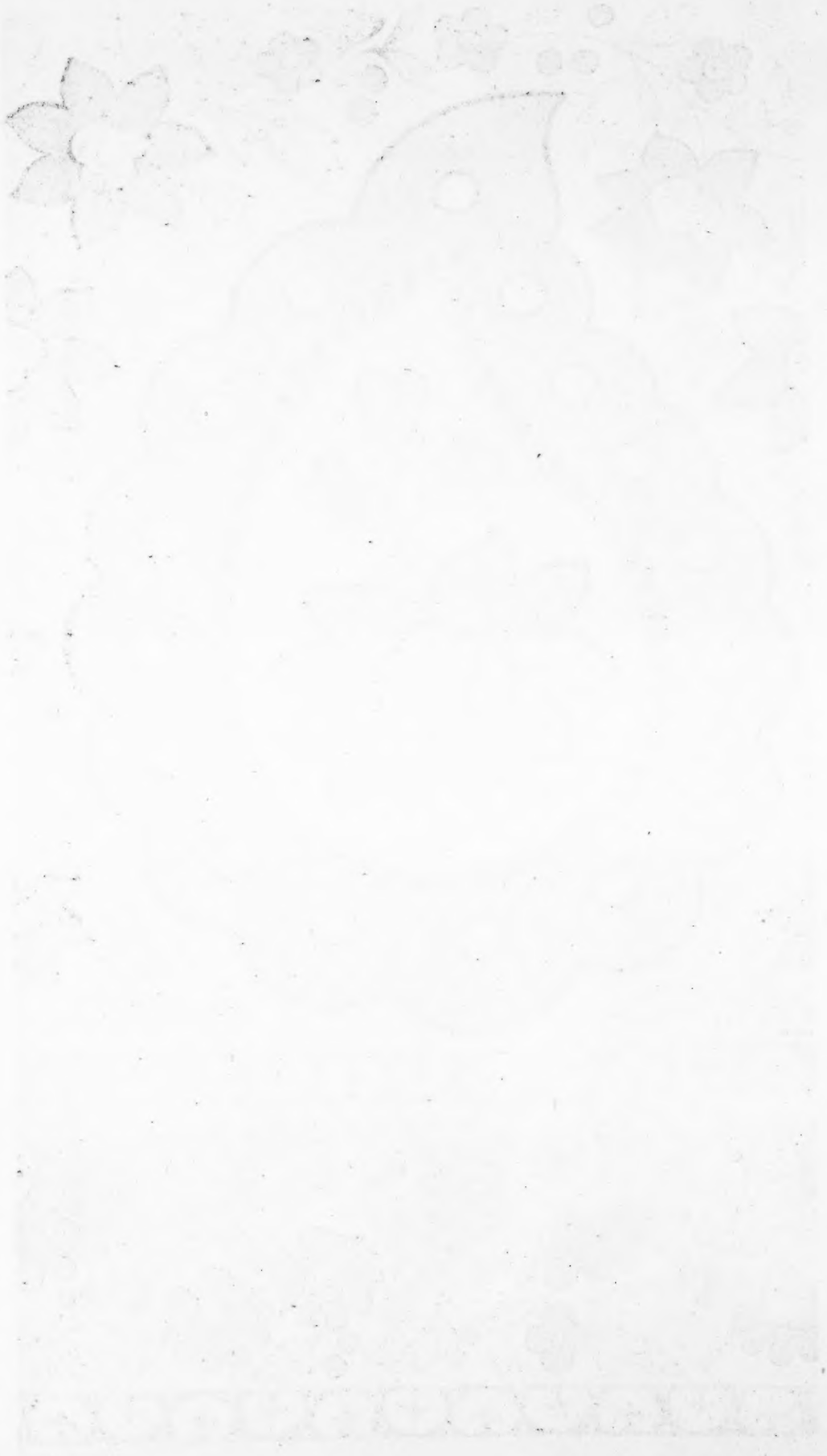
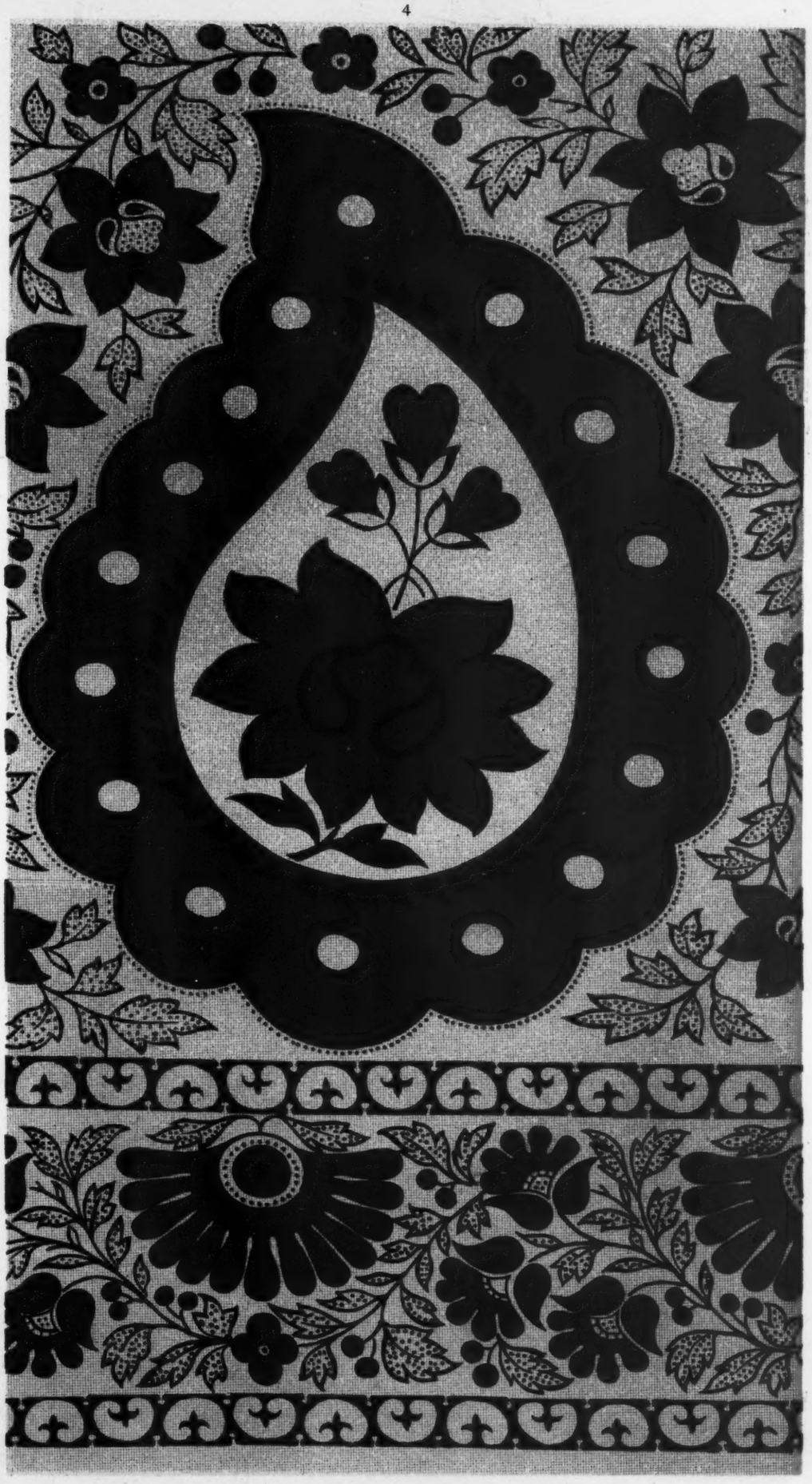




95 (10, 18).—IMPORTED COLOUR-PRINTED FABRICS.

"Of these printed fabrics I submit samples taken at random from a large collection which has been examined by me, for the information of Government, as proof that my condemnation is not unjust."—E.T.





96 (4).—IMPORTED COLOUR-PRINTED FABRICS.

Of these printed fabrics I submit samples taken at random from a large collection which has been examined by me for the information of Government, as proof that my condemnation is not unjust."—E.T.

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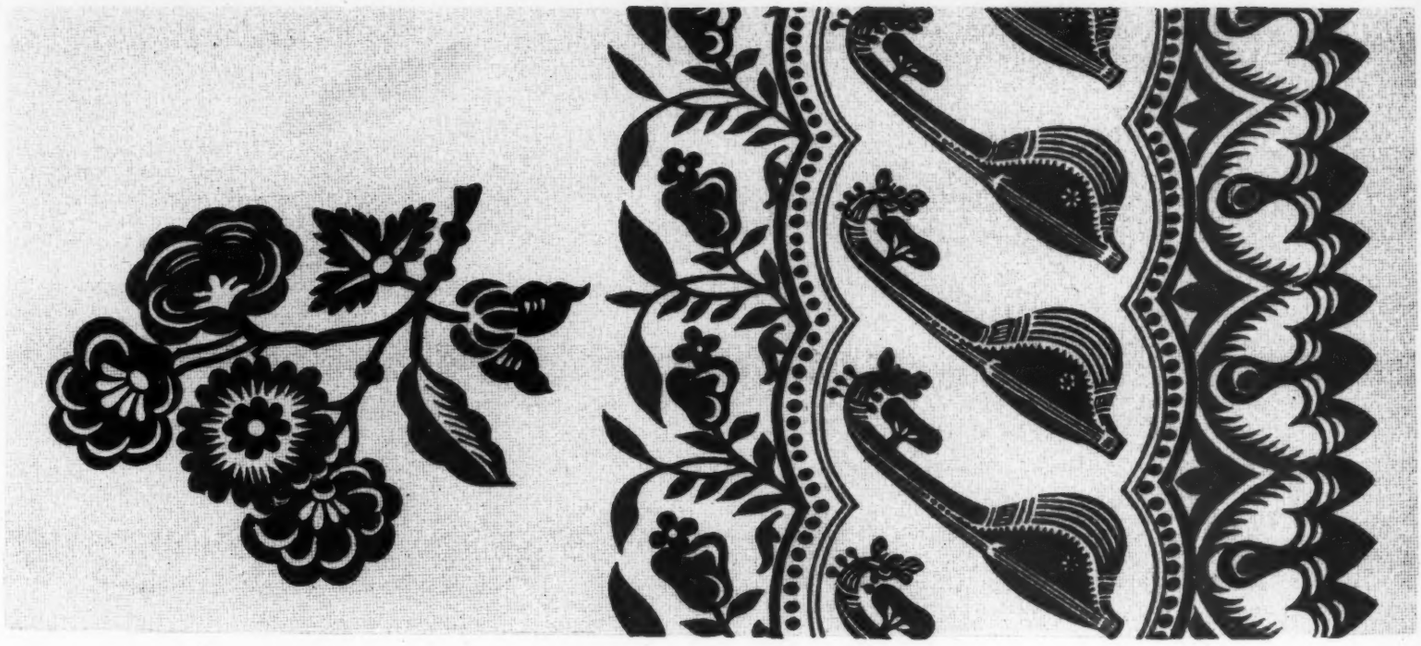

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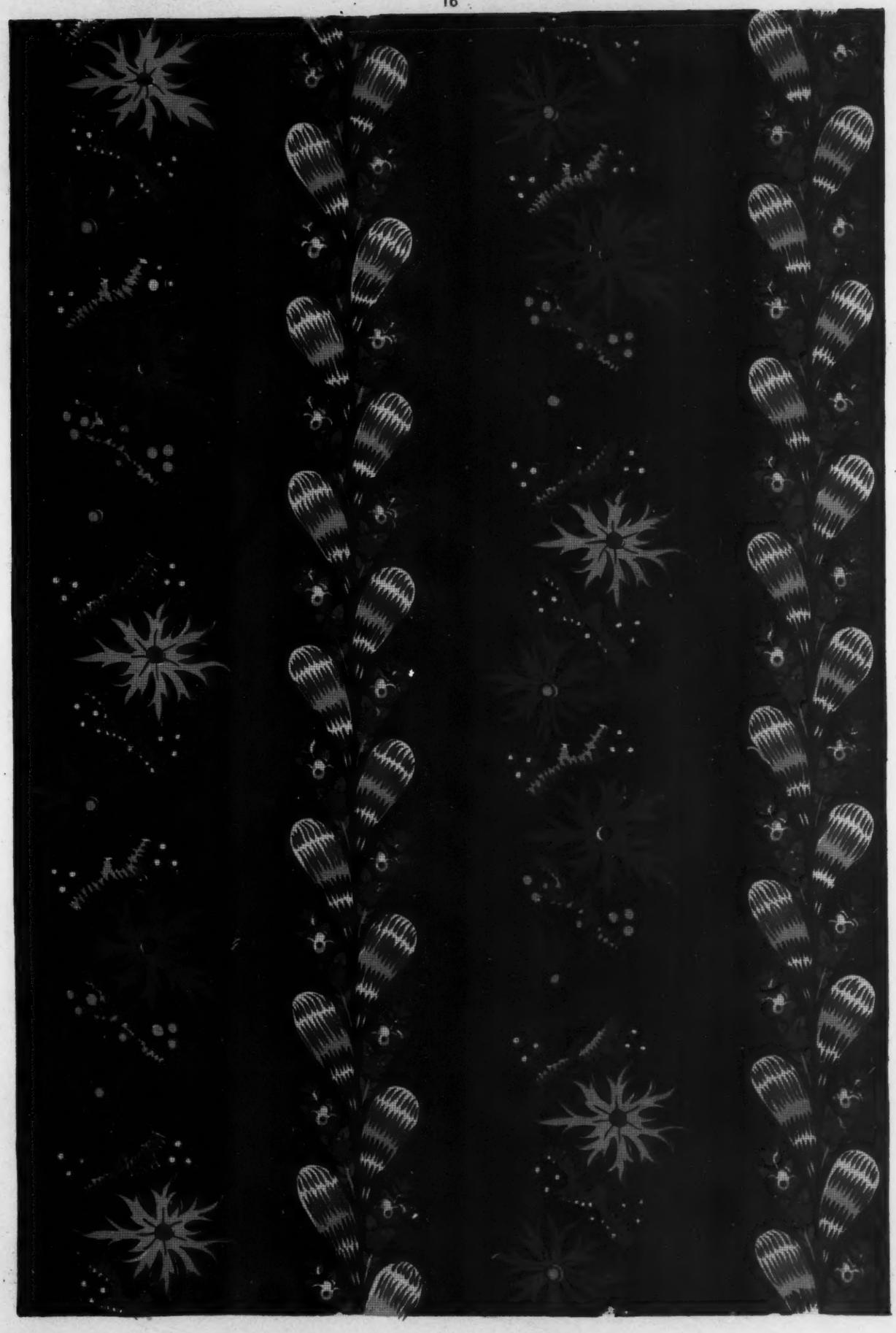
97 (5, 7).—IMPORTED COLOUR-PRINTED FABRICS.

"Of these printed fabrics I submit samples taken at random from a large collection which has been examined by me, for the information of Government, as proof that my condemnation is not unjust."—E.T.



98 (16).—IMPORTED COLOUR-PRINTED FABRIC.

"Of these printed fabrics I submit samples taken at random from a large collection which has been examined by me for the information of Government, as proof that my condemnation is not unjust."—E.T.